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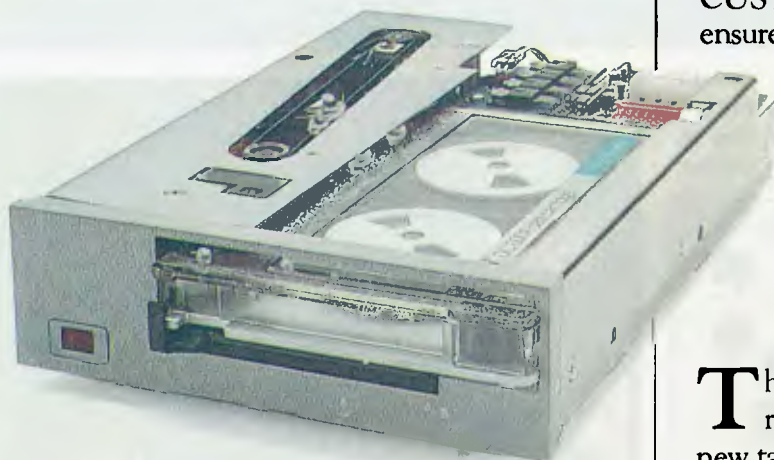
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PC Australia is a BRW Publications production. **Group managing editor:** Robert Gottlieb. **Group publisher:** Steven Congerton.

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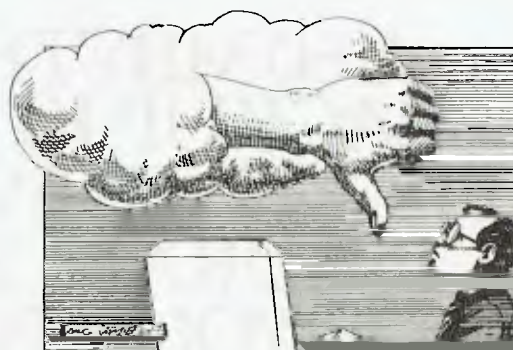
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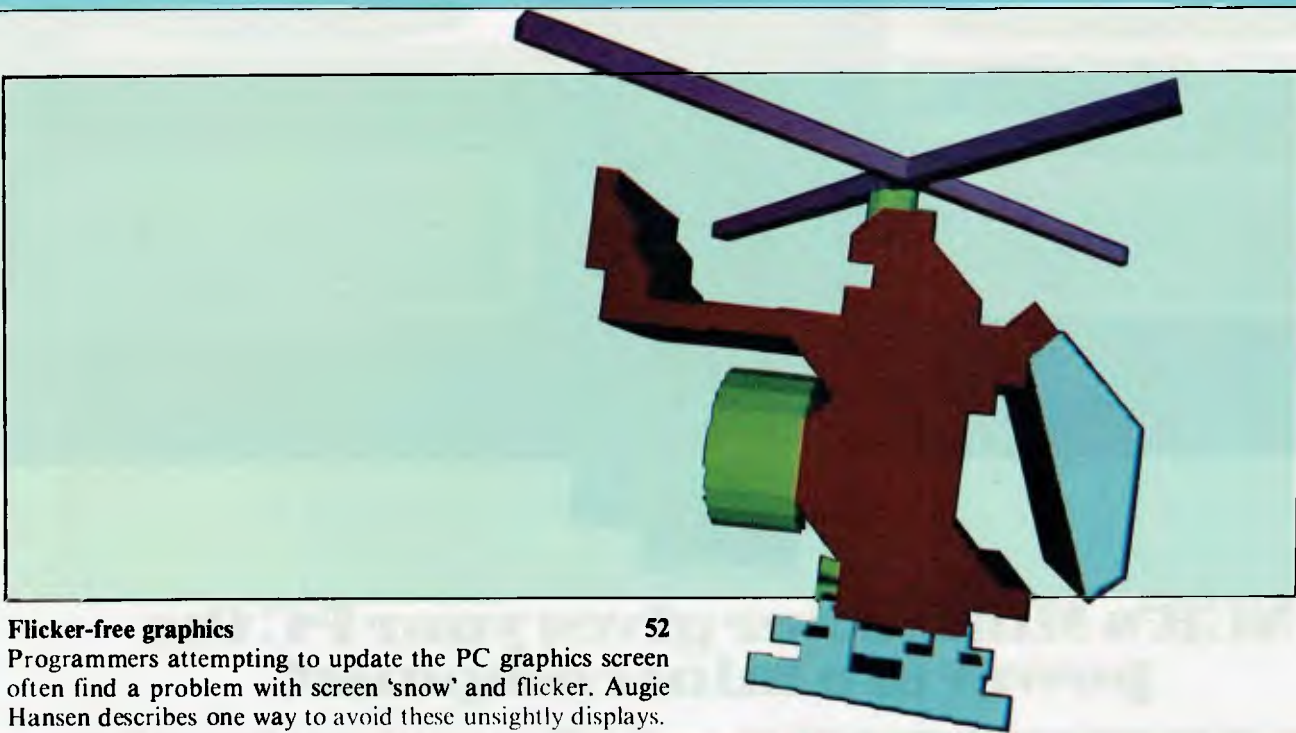
Stephen Murray wades through more fan-mail to reveal another selection of readers PC hints, tips and patches.

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COVER: ANDREW GASH



#### Flicker-free graphics

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The IBM phenomenon has been analysed by many over the last few decades. Les Stein adds his contribution to ongoing discussion.

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# The dreaded worm



Consider this scenario. After completing the final draft of the budget plans for next year's big project you save the 220K spreadsheet model, jump to your favorite word processor to amend a few figures in your final report, and contentedly toss out your rough notes and calculations. Then, just before switching off the PC and retiring to the local pub to celebrate, you decide to check for any messages on your PC bulletin board service — at this late hour you may get in at the first call.

You are lucky; following the familiar dialling tones you log on to the system. As expected there are a number of messages waiting, many of them several days old because you have been too busy to check out the BBS. But what interests you the most is the new sign-on greeting, informing you that a heap of new public domain software has been uploaded onto the system over the last weekend and the sysop is keen to get responses from users as to its quality.

Skipping your messages, you jump straight to the file transfer section of the BBS, given that you are communicating during "prime time" and have only 27 minutes left on-line. Scanning the "new files" listing, you drool as the file names flash by at a

1200-baud blur — RAMBO2.COM, PACMAN3D.EXE, EROTIC.PIC, and DATABASE.PAS.

Silently praising the wonders of XMODEM you watch the block numbers tick-over like an accelerated digital clock, and as the little red light on your hard disk flickers with delight you daydream about the collection of software gems it is digesting. Finally, with barely three minutes left, you have a quick look through your message headings before logging off — there will be more time to read them tomorrow.

With adrenalin still pumping — you perform a quick exit from your trusty communications program, type in the name of the most exciting piece of downloaded software, hit the carriage return key and then it happens . . .

Your monitor flashes through a variety of background colors before settling down to the single ominous message "SO LONG, SUCKER!". As the initial shock subsides, you become aware of the strange grinding noise coming from your rapidly-reformatting hard disk, as it methodically vaporises your 220K budget along with everything else.

When it finally dawns on you what has happened, you leap for the Big Red Reset switch on the side of your PC. Realising that it is way too late, you can not help wondering if one of those neglected electronic mail messages contained a warning about the dastardly "Trojan horse" program that you have just invoked.

All sounds a bit far-fetched? Then think again, because these "Trojan horse" or "worm" programs do exist, and are frequently uploaded onto PC bulletin board services, usually under misleading guises. Although I have only heard of a few local cases, in the US PC community these programs are causing a major panic.

"Trojan horse" programs are so named because they enter unsuspecting PCs under a false guise, and are aimed at doing serious

damage from within. Contrary to popular opinion there are many ways that software can attack your hardware. You would be surprised at the relatively small amount of code it takes to re-format your hard disk and destroy days, possibly months (depending on how often you make back-ups) of hard work.

With the increasing proliferation of PC-based bulletin board systems across the country, and the wealth of public domain software flooding in from around the world, many sysops do not have the time and energy to thoroughly check every single item that is uploaded on to their systems. Therefore we are likely to hear more reports from the victims of these deadly "worms" as time goes by.

So what can you, the PC user, do to protect yourself from this particularly vicious form of high-tech practical joke? In a nutshell, examine closely any new item of software that you obtain through public domain channels, treat with suspicion any program not in source-code format and, above all, back up important data before running a foreign program for the first time.

Furthermore, if you do discover such a program, publicise it as soon as possible through the originating BBS (and others) to prevent other PC users from falling into the same trap. It may be possible for the sysop to trace the program's origins from the log of callers. Make sure that the sysop removes the offending program from the BBS software library, and publicise your discovery through other channels such as user groups (and perhaps even computer magazines such as PC Australia). After all magazines, user groups and bulletin boards are all part of the informal support structures that exist to help PC users get the best — and avoid the worst — from their systems.

*Melbourne readers can tune in to Ian Robinson on 3AW's Computer Cafe from 8.30-9.00 pm Thursday nights.*

# Complex confusion



**S**ystems for producing color slides, transparencies, word charts and graphs for reports are increasing in popularity, but, like other systems, PC graphics packages often confuse and dismay their users because of their complexity.

This is especially true of some of the older graphics systems, which still require the user to type in commands like, "set the Grid color to gray". Command-driven systems, which require the user to know the available commands and their exact spelling (e.g. "GRAY"), cause hours of pain for the unfortunate DP people in charge of the graphics. Artists and other non-programmers are particularly prone to misprints and misunderstandings.

Moreover, many of these systems are so slow that they are only really useful in batch mode via a command file (a hangover from the days of punched cards — you submit a job and wait hours or days for the result.) The boom in PC graphics has led to a new, simpler method for communicating with users: menu-driven, chartbook systems. Because PC software is sold more cheaply, the suppliers have to make it simple enough to use immediately without

expensive training on-site.

Paradoxically, the cheaper the package, the better the user interface and documentation. The trend in chartbook graphics, however, was originally started by ISSCO a supplier of large mainframe software. ISSCO pioneered the idea of a book of sample charts from which the user can pick the format closest to his requirement and fill in the blanks for titles, values and legend.

The ISSCO product, Cuechart, set the standards for nomenclature and variation of the charts. Although Cuechart is available only for mainframe or minicomputers, other manufacturers have stepped in with PC versions of chartbook software using the same sample charts and names: for example BY100 (yearly bars, one variable); PIE501 (five pie charts on a page).

The Zenographics Autumn software, available for IBM PCs as well as mainframe computers, offers all the commonly-used formats for its chartbook. The quality of the output is not compromised by using only a PC because the quality is mostly determined by the resolution and features of the output device. In fact, some low-cost devices such as the Tektronix 4695 color printer (\$3500) work much better since they can be used at their full resolution (1500 x 1000) compared with a screen dump from a mainframe terminal (typically 480 x 360).

Almost 90 per cent of presentation slides are word charts, that is, several lines of text with no graphics at all (a poor reflection on the imagination of the business community.) Color theory suggests that text slides have maximum impact if the background is blue, and the text yellow. Also, the text must be clearly legible and preferably not looking like computer characters. Solid text fonts, such as Helvetica are available for most systems, although it is often better to

use the device's own hardware characters. Film recorders such as the Quintar 1080, and Lasergraphics printer controller offer a range of solid hardware generated text fonts which line up exactly on the pixels of the output device, producing very sharp, crisp text.

If you are using one of the modern, digital equivalents instead of a slide projector, there are several other features that the software should handle — e.g. to be able to pause during the display of the text slide, to talk about each item before displaying the next one. Devices like the General Parametries Videoshow also allow 'highlighting' of the text lines, using remote-control to change the color of a line, or flash it on and off. Alternatively parts of the slide can be changed, for example to display a new block of text under the same title. The General Parametries' 'Pieturelt' package, a chartbook-driven system, supports all these features for the Videoshow.

Line and bar graphs are very simple to generate with a chartbook. It greatly simplifies exercises such as fitting five pie charts on a page, or generating partially overlapping bars. One problem that sometimes crops up is that the text labels in the sample charts are all very short, whereas in real life they often require several words. Where space is limited, it is useful to be able to make one label several lines long, or slant the labels at an angle.

Finally, there is invariably at least one small change needed when the chart is produced, — even if it is only to add the company logo at the top. A free-form graphical editor, or drawing package, is a great asset, allowing the user to add a logo, explanatory text, arrows or even to change the shape of the graph to suit the presentation. ■

*Harry Hvistendahl is a director of Dimension Graphics*





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# A thirst to quench

Several of our more technical features have inspired responses from readers, as this collection of letters shows:

## Adding to the wish-list

Recently I read the Guest Editorial on Release 2 of Lotus 1-2-3 (A Disappointing Sequel, PC Australia May 1986), and I would like to present an alternative viewpoint to the author's adverse business outlook. We used 1-2-3 Release 1A for analyses of scientific data because, with all its limitations, it was still easier than writing it all ourselves. With Release 2, scientific analyses are so much easier again. I will outline a few examples:

- In order to do a simple regression of the form  $Y=AX+B$ , we previously had to create  $X^2$ ,  $Y^2$  and  $XY$  columns, and perform explicitly all of the calculations. Now all it requires is / Data Regression Graph (after setting  $X,Y,0$ ).
- The / Data Matrix command is also wonderful. Have you ever written a program to invert or multiply matrices? Never again with / Range Transpose, which is also handy for when you write your rows and columns back to front.
- Hiding and displaying columns or ranges is great for printing out portions only, and for prettier plots.
- The / Range Value command is another little beauty. Instead of copying the formulae by accident or having to write a macro to go through and (Edit) (Calc) it all.
- Also, / Data Parse is most useful, especially for importing data which has blanks for missing values. This used to get the columns all out of alignment, but now you can just / File Import Text and then / Data Parse!

However, I must agree that there are still limitations. For instance, I want true A4 paper, not US sizes.

Letters should be sent to Ian Robinson PC Australia, GPO Box 55a, Melbourne 3001, or Viatel Mailbox 360241220

I would like to see a facility to allow graphs of functions. For example, to plot data on different probability papers requires painstaking calculations of the transformations each time, which absorbs much of the worksheet space. I think wistfully of a / Graph Function command, where I could define my own functions of  $X$  or  $A-F$  ranges. Given the limits now I would like to suppress the numbers on the axes, or replace them with other numbers. This way, even though the number that defines the  $X$ -coordinate is  $\text{LOG}(\text{DAYS})$ , the label I really want displayed on the graph is 'DAYS'.

I would like to add ranges together, such as when the  $X$ -range is  $C20..C56$  and I want the squares of  $A$ -range to be from  $D20..D32$  and  $E33..E56$  say. It would also be nice to have a 'no symbol' choice (if there are 200 points, then the plotter wears a hole in the page, and it really is not appropriate to use a line to join points), and I would like a step function to join points. In fact, what I need are scientific graphs — not business graphs.

I would like to have output device configurations defined in separate files, so that I can switch from parallel printer to serial plotter quickly and easily. In fact, there are heaps of things to look forward to in Release 3 of Lotus 1-2-3. But I still feel that Release 2 is much better than your Guest Editor (Jim Seymour) understood.

Ruth Calcott  
Mayfield, NSW

*Well, that certainly is an extensive wish list! I just hope that user demands such as yours do filter through to the powers that be so that new releases of popular products are more attuned to market requirements. I think that Jim Seymour had a similar (or more extensive) wish list in mind prior to the launch of Release 2,*

*which is why he felt so disappointed when it finally reached the market.*

## WordStar-LaserJet connection

As a PC Australia subscriber, I seek your assistance. At work I have a PC running WordStar 3.3, linked to a standard Hewlett-Packard LaserJet printer, and can only print with the Standard Large Print facility. I would like to be able to take advantage of the different fonts available.

So far one dealer has unsuccessfully tried to load the 'escape sequence' characters into the WINSTALL section of WordStar, and another dealer said WordStar 3.3 was simply not capable of loading escape sequences of more than nine characters.

After contacting Imagineering and Hewlett-Packard, I have still not had any success in establishing whether in reality the LaserJet font cartridges are useable with WordStar 3.3. I would be pleased if you would investigate, the matter.

J. L. Fyffe  
Brunswick, Vic.

**Jenny Miller of Hewlett-Packard replies:** *The LaserJet is becoming increasingly popular as a letter-quality printing tool in a word processing environment and many software vendors are working with us to incorporate drivers for the LaserJet with successive releases of their software. Since WordStar was written long before the LaserJet printer was introduced, varied levels of support exist, depending on the version used. I will address three versions of WordStar in terms of handling different HP fonts and cartridges.*

*Version 3.3B was pre-LaserJet. However, it can be customised to work on the LaserJet by selecting another HP printer (HP2934) and modifying various parameters such as printer initialisation. With the HP "A" font cartridge, italic and bold printing can then be achieved in portrait*

orientation, and compressed print (16.66 pitch) in landscape mode, by using control characters. To select and use any other HP font or cartridge, the user must employ escape sequences to specify the desired font. These escape sequences are to be included in the document before the text requiring enhancement, in either of two ways. The first is to create 'user-defined escape sequences' from within WordStar (i.e. ^PQ, ^PW, ^PE and ^PR). Since each control sequence can contain a maximum of four characters, using all codes together results in a limit of 16 characters. Hence a problem arises if more than 16 characters are necessary.

This problem is overcome by an alternative method, whereby the complete sequence is typed directly into the document. Since the escape character itself cannot be typed into WordStar text, one of the user-defined control codes must be assigned as escape (usually ^PE) and used instead. Version 3.33 offers the LaserJet as an option in WINSTALL's printer menu, so no customisation (as described) is necessary. To select and use the fonts, both methods previously described can be used.

Wordstar 2000 also offers the LaserJet as an installation option. Escape sequences are not necessary to select and use the fonts, since they are available in a 'Print Font' menu. The command ^PF will display a menu of alternative fonts. Simply type this before the text to be enhanced, select a font and type ^PF again to end the font. (Note — with any software a font selected will only be implemented if it is one of those residing on the cartridge currently installed on the printer.)

WordStar 2000 supports many of the attributes of HP font cartridges, including line printer typeface, non-proportional 10 and 12 pitch, proportional Helvetica, Times Roman 10-point, 8-point, bold and italic. Please note that, at the time of writing this, a 'release 2' of WordStar 2000 is

claimed to offer "extensive print capabilities including fonts and proportional spacing". Micropro or its local representatives may be able to provide further details.

An alternative word processor is Microsoft Word. In a similar manner, the user can select text to be enhanced and, with relatively few keystrokes, select the enhancement. Microsoft Word includes drivers to take full advantage of all 18 HP font cartridges ('A' through to 'W'). This includes drivers for the internal fonts and both landscape and portrait orientation.

To recapitulate, it is possible to invoke fonts from WordStar 3.3B, but it is not as neat and convenient as with WordStar 2000 or Microsoft Word. Hewlett Packard has available technical documents that will clarify and expand upon the points I have mentioned. Should any PC users require further information they are urged to contact their authorised Hewlett-Packard dealer.

#### More on Fortran

Here are some thoughts on PC Fortran compilers that arose after reading Bill Fitzgerald's excellent article in the May issue.

First and foremost, I agree with Bill's general comments regarding Fortran versus 'the others'. Despite several flirtations with Pascal, BASIC and COBOL, I find myself constantly returning to Fortran whenever there is a 'real job' to be done.

I think, however, that Bill has underestimated the importance of the physical size of the compiler and/or libraries, especially for those who, like myself, own what I call a 'common or garden PC' — 256K RAM and two floppies. I note with envy that both test machines had hard disks, and most of my comments assume much less importance for those so blessed. Nevertheless, my points are as follows:

For smaller source files, the time taken to simply read the compiler from disk and perform the housekeeping becomes dominant. This is particularly true of those

compilers that are so big that they need to be split into two (or more) passes or phases. For example, the Microsoft F77 compiler has two (and optionally three) passes. Not only does the loading take time, but the necessity to use temporary disk files to transfer information between the passes further slows down the overall process. For example, I have seen the Microsoft F77 compiler take 45 seconds to compile the minimal program:  
STOP  
END

If a compiler and associated libraries can be made to fit into 200K to 240K, then there is a good chance of creating a development disk containing compiler, linker, library manager and (depending on the remaining space) an appropriate editor. It is amazing how irritating changing disks between the compilation and linking steps can become.

Finally, if the computer is small enough then it may be possible (even with 256K) to set up a RAM-disk just big enough to hold it. This would have the dual benefits of lightning-fast compiler loads and of freeing space on the Fortran disk.

I believe that in many cases, especially if one is trying to cultivate good modular programming habits, development time is of more significance than the run-time efficiency of the final program. To this end a quick compile/link turnaround is vital, and I would therefore normally prefer a small, fast (even if somewhat stripped-down) compiler to a much larger one with all the bells and whistles.

Joachim Mika  
Rosanna, Vic.

**Bill Fitzgerald replies:** *Your comments concerning the editing/compilation cycle on floppy-based PC systems are most pertinent. I spent a year developing a large suite of Fortran programs on an old Morrow Decision II CP/M system*





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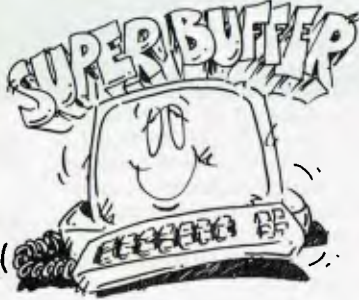
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## LETTERS TO PC

*some years ago. Grind, grind, whirr, whirr — but it did make me appreciate the speed of a hard disk. I used a very small Fortran compiler (Microsoft F80), a small word processor (it loaded into 30K) and a typical edit/compile cycle took around three minutes. It was the linking that took all the time — five minutes or more, and a RAM-disk did not expedite matters.*

*Compared with the 'latest' compilers (especially Microsoft F77) you have stepped backwards in speed and performance. I would recommend using a smaller Fortran 66 compiler such as Prospero or Nevada for your compilation cycle, and only when you are ready for the final production version call in the Hefty F77 compiler.*

### A new Form of Piracy

Thank you for an excellent magazine. I always read all of it and find it informative, but I enjoy the programming articles the most. Hooray for your FORTRAN comparison!

It is, however, a very serious matter which prompts me to write. I am a member of the PC Software Interest Group (PC-SIG) and a strong supporter of public domain software. I have just received a letter from Technical Imports Australia (TIA) proclaiming that for just \$25 (!) they will provide a copy of any individual disk from the PC-SIG library.

For the uninitiated, public domain software is free of charge, and is donated or 'placed in the public domain' by the original author for whatever idealistic or generous reason, to be distributed freely. The only charge involved may be for the media and copying fee, and many authors place a maximum limit on what amount may be charged. Some authors used work on the 'shareware' or user-supported scheme whereby a nominal donation (usually between \$10 and \$75) is requested, if the user finds the software useful and desires support and upgrades.

I am an avid user of public software and believe some of it to be the equal,

if not the superior, of many expensive commercially-available programs. The PC-SIG maintains a software library of almost 500 disks full of various PC software, covering the full gamut of applications. Any disk is available to members or non-members for \$US6, or the entire library is available on a single CD-ROM for \$195. These are very fair prices considering the work involved in maintaining the library, printing directories, and keeping members up to date. A single disk can often be bought for under \$10 in Australia, and never more than \$11 if full duty and sales tax are applied.

This brings me back to the \$25 charged by TIA for a copy of a disk from the PC-SIG library. I cannot believe that the cost of one DSDD floppy and some copying time can add up to the \$14 difference between this charge and the original \$11 cost, and I certainly cannot accept the increased profits made from repeated copying of a master disk. The most disturbing aspect is the absolutely disgraceful immorality of someone making money from the work of people who, for ideological reasons, want their work to be freely available. I perceive this as being much worse than the immorality of pirating software.

I have donated software to the public domain and I would not like TIA or anybody else selling it for a profit. It is for free distribution only. While this is not the only case of very high 'service' charges being applied to public domain software, it is easily the worst and most blatant.

Finally, I would like to add that there is an official PC-SIG outlet in Australia, namely Manacomm Pty Ltd of PO Box W42 West Pennant Hills NSW 2120, which can be phoned on (02) 875 3538. This company distributes PC-SIG disks for only \$11

I urge all PC users to try out some public domain software (if they have not already done so), but to make sure they get it from a user group, bulletin board, or reputable source.

Paul Doornbusch  
Glenroy, Vic.





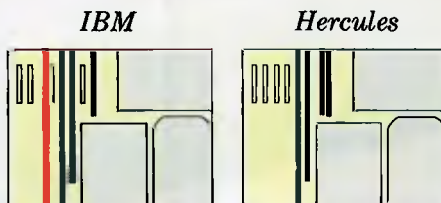
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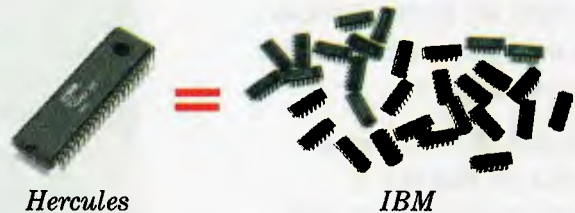


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What will really surprise you is how quiet it is for the speed— less than 60dBA. It has all the options like an automatic cut sheet feeder with full width (15") paper handling. And it doesn't cost an arm and a leg to run, like those photocopiers.

With its high duty cycle and optional serial interface, the SP-320 is also perfect for network or minicomputer applications.

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# News

## Entre counts on success



William Mak: his abacus is comparable to a PC on some things

Despite gloomy reports of PC dealerships merging, consolidating, going bankrupt and generally experiencing difficult times, a new PC chain has decided to establish itself in Australia. It is Australia Entre, a local version of the successful US Entre PC dealership.

Entre has launched three 'centres' in Australia, at Moorabbin (a Melbourne suburb), Sydney and Adelaide. The company sees this number expanding to over 20 within the next 18 months, bringing the total number of outlets worldwide to more

than 350.

At the opening of the Moorabbin branch accountant William Mak demonstrated the abacus, an age-old calculating device that provided an interesting contrast to the state of the art PCs on display.

Mak claimed that the abacus was comparable to a PC where additions and subtractions were concerned, but the PC was way ahead on more complex calculations.

He admits using an IBM PC at work, saving the abacus for more ceremonial occasions.

## A handful of compatibility

Discware has announced the Australian release of what is claimed to be the first handheld IBM PC compatible—the Datacomputer. The new product is manufactured by US company National Datacomputer and is aimed at people who work with data in the field, rather than behind a desk.

The 1.1kg Datacomputer fits onto a belt and includes a 27-key alpha-numeric keyboard, 24-character display, real-time clock/calendar, light pen interface, serial port and plug-in RAM boards allowing up to 256K of storage. The 32K internal ROM provides close compatibility with both MS-DOS and the IBM BIOS interrupts, so that applications may be written on a standard PC and downloaded into the Datacomputer.

Power is supplied by AAA batteries that provide up to 100 hours of use and an internal lithium cell will keep programs and data alive for up to seven years when not in use. The Datacomputer is aimed at salespeople, inventory takers, accountants, and field service technicians (who typically enter data at about 6000 keystrokes per hour) and can also be employed as a passive data collection terminal or bar-code reader.

The Datacomputer is priced at \$US1795 for a 64K system, up to \$2995 for the full 256K model, but local prices have not yet been established. Bundled with the system is a disk of programming utilities, including keyboard and display routines, bar-code decoder programs, and drivers for modems and printers.



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The PC Australia Top Ten is derived from monthly surveys of over 240 PC software outlets by Compass Research.



# Mitsubishi's strategic tool kit

Mitsubishi Motors Australia has chosen the IBM DB2 relational database and locally produced Executive Control Tools (ECT) software to develop an integrated computer system.

The purchase of DB2 and ECT is part of the company's revitalisation. The packages were chosen because Mitsubishi could not get new systems developed and running quickly enough. Their previous systems were

written in many languages and could not guarantee all the strategic information required for company management.

Mitsubishi handles many operations in the different sections and locations of its South Australian plant. The company wanted a system that would meet the requirements of the engineering, production and manufacturing sections without tying up the main computer.

ECT is a standardised package that can be applied to all the business units in the company. Data and results from all operating areas can be combined, it will complement the DB2 system and will enable the company to carry out front-end analysis.

Dictionary Software Systems, the developer of ECT, calls the package "a tool kit of computer programs that supports and enables efficient, cost-effective management and development of computer systems. It also provides an environment whereby an organisation can model itself with respect to its functional areas and its corporate directions."

ECT operates on the principle that it is only through the development and maintenance of a genuinely logical model of an organisation's requirements that accurate information systems can be designed and resources optimised. Running on an IBM AT, ECT is a set of integrated programs used as an organisational modelling dictionary database to define, model and control organisational and informational functions.

ECT was designed to bring an organisation's development and implementation process under control and management. It is essentially a modelling tool, based on advanced relational database concepts.

The package is also an infor-

mation system and development tool, allowing systems to be designed, prototyped and implemented. It is capable of automating functions that traditionally have been carried out by specialists, such as systems and information analysis, database administration, forms design and corporate planning. Dictionary Software claims these tasks can be performed by people who are relatively unskilled.

The "tools" are data, function, implementation and enterprise modelling, model query, schematic output, user environment interface, user hook interface, code/data resource generation and resource load, worksheet, data and model management, and normaliser.

ECT is supplied on floppy disks, with each tool contained on a separate disk. Individual tools can, therefore, be detached from the main system and distributed to remote users.

The software is useful for performing functions such as user requirement studies, feasibility studies, system specifications, and project management.

ECT supports C, COBOL, and dBaseIII. It was designed for an IBM AT running PC DOS 3.0 but can also run on PCs and XT's under MS DOS 2.0 (or higher). A 512K memory is necessary and a hard disk and floppy disk (360K) drive are recommended.

## The latest in RDD technology



*Titan LT200: formatted storage capacity of 20M and resistant to vibration and shock.*

After three years in the development stage, US-based LaPine Technology has finally released its 3 1/2 inch RDD, the Titan LT200.

This model has a formatted storage capacity of 20M in the same physical size as that of a 3 1/2 inch floppy disk drive. A feature of the LT200 is its vibration and shock resistance, due to four internal suspensions for the disk drive assembly and a head elevation mechanism, designed to lift the heads from the disk surface when the drive is not in use. This eliminates any increased start-up torque, damage to the heads and disordered head arrangements.

The unit is fully sealed against

dust and has a filter located above the spindle. The LT200 has increased the track density limit of open loop drives to 835 TPI by the high head positioning.

The lightweight compact unit can have up to four different addresses specified through plug-in jumper wires. Its circuits are mounted on four-layer printed circuit boards that are installed inside a protective frame. The circuits incorporate self-diagnosing capabilities for monitoring the operation of the power supply section, controller and drive assembly.

The Titan LT200 is available in Australia through CVA Computer and Peripheral Sales of Asquith, NSW.



*Mitsubishi executives admire the IBM DB2 relational database.*



## A modern beauty

Beauty and the Beast is an old story but it was given a modern touch at the Ausgraph 86 Computer Art contest.

The aim of the contest was to encourage artists to exploit the creative potential of the computer rather than use it to produce art reminiscent of traditional artistic techniques and media.

Felicity Coonan won with four graphics below — Beauty and

the Beast — which the judges decided were an example of using computers to create a form of art which could not be easily duplicated by traditional methods.

Her prize, donated by TCG was a trophy plus \$1000. In the junior section Peter Barton won \$250 for Godzilla because of the excellent quality of the work in light, the low cost equipment used and the imagination shown in the subject matter.



## Ausgraph 86 — the show

The item which attracted most interest at Ausgraph 86 was IBM's RT 6150 model 20 with a 6154 display.

This reduced instruction set (RISC) PC, used for scientific and technical applications, was running a 5080 CAD/CAM environment designed graphics system.

Several graphics packages for the RT were demonstrated including CADAM, engineering drafting system software; INTERLEAF, workstation publishing software linked to 3812 laser printer; APPLIX 1A, a package integrating text, spreadsheets, database and graphics; and, CATIA, a 3D modelling system.

Datamatic demonstrated two useful IBM compatible products — Metheus and CADvance.

Metheus, from Omega Products, is a color display processor card with a processing speed that exceeds five million pixels per second for solid-line or patterned-line fills of polygons.

It features high resolution, 128K of additional offscreen image and data storage, four image bit planes, and 40 instructions that are specified by microcode on a floppy disk, as part of the standard configuration.

CADvance, from CalComp, is a 2D CAD software package for the XT or AT. It features high quality professional designs and drawing options, a full fea-

tures database, full screen text editor and automatic dimensioning. With nested display commands, users can pan, zoom, display a grid or run a macro while still in the DRAW command.

CADvance can be used in conjunction with dBaseIII and Lotus 1-2-3. It also supports plotters, mice, printers and digitizers.

Dimension Graphics displayed a range of business and presentation graphics systems for image capture, technical publications, visual presentations and CAD. Of particular interest were Mirage 4.3 (from Zenographics), Chorus' PC-Eye, PictureIt and presentation hardware from Videoshow, and Vega's Video7 range of EGAs.

Forty-six companies took part in Ausgraph 86, the fourth annual conference and exhibition on computer graphics organised by ACGA and held at the Sydney Hilton Hotel and Sydney Town Hall.

The speakers included Joel Orr, one of the world's leading consultants on CAD/CAM, Xavier Nicolas, director of the French animation house, Sogitec, Russ Maehl of XYZAP, Australia's leading animation and computer video graphic house; Leon Szarski, head of the Melbourne University CAED Centre; and Dr Graham Freeman from CSIRONET.



## Bridging the fax gap

Systems Solutions has released what it believes is the first product in the world to provide a link between personal computers and the facsimile network. PC Fax is a hardware/software package which includes a specially designed expansion card and modem for PC XT's, AT's or compatibles.

Although PC modems and fax systems use standard telephone lines for data transmission, the two technologies are based on entirely different communication parameters. PC Fax includes routines to convert PC-DOS text files to the fax Group 3 compressed image standard, prior to transmission through the fax network. The program will also function as a receiving station and re-convert compressed images back into computer-readable files.

## Persyst gets two new distributors

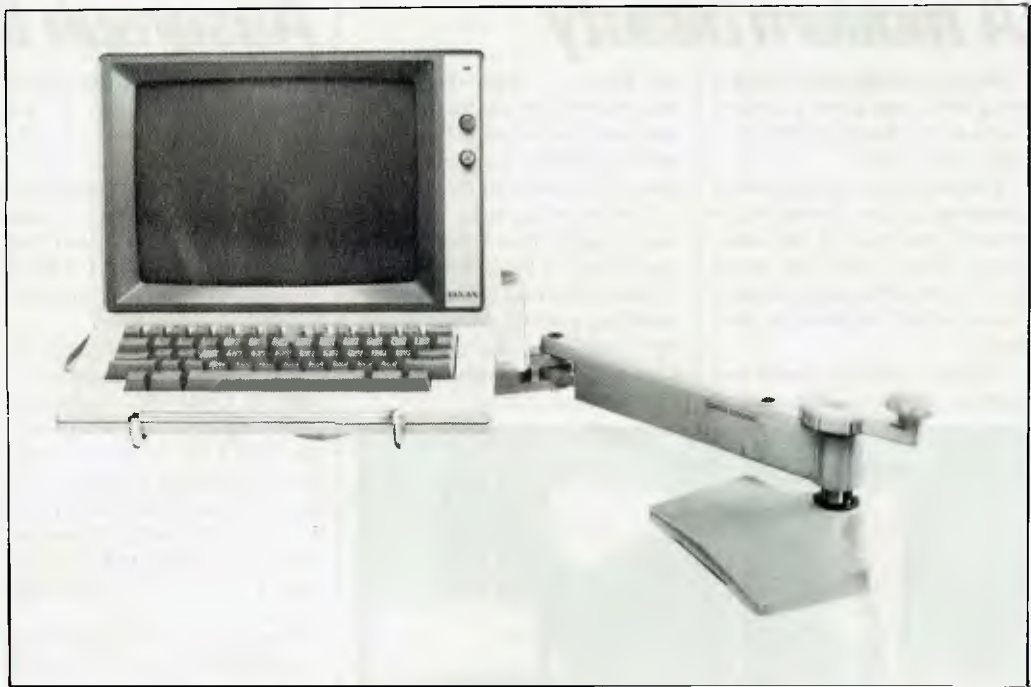
The Emulex Corporation has announced two new distributors in Australia for its Persyst range of PC enhancement products — IPL Datron and TechPacific.

Sydney-based IPL Datron will service dealers in NSW and Queensland, and TechPacific of Melbourne will service the southern states.

Both companies already distribute PC related products but will now carry the complete range of Persyst hardware, software and spare parts. A full range of associated services including product training and warranty maintenance will also be offered.

Persyst is one of the largest manufacturers of multi-function, graphics and enhancement products in the US. It also designs custom VLSI (very large scale integration) chips.

## Data Decor makes room



*The long arm of space saving: Data Decor leaves room for other work.*

Just as housing mainframes are a problem for some companies, other businesses and PC users have difficulty in trying to accommodate PCs and make efficient use of office space.

It is not uncommon to see staff, ranging from the managing director to receptionist, using a VDU that occupies valuable desk-top space. There are two solutions. Users can buy more desks or invest in the VDU arm

from Data Decor.

Data Decor is a Melbourne-based company that specialises in ergonomics. Its Australian-made VDU arm is designed to provide maximum working space on a desk when the screen and keyboard are not in use.

The arm, with its heavy duty platform, can be fitted by bracket or flange mount to any desk top. The platform is attached to an articulated arm to swing the

computer out of the way.

It is provided with height adjustment through 115mm and swivel tilt controls. The platform can tilt through 24 degrees. Both the retainer and the terminal can rotate 360 degrees.

The platform has a handle for storing the keyboard and can carry up to 100 kilograms.

Bases for most screen models are available. The price for the arm is \$275.

## Using your memory

Sydney-based Software Suppliers has announced Memory/Shift, a RAM-partitioning program which allows PC users instant access to up to nine different programs, eliminating the need to open and close files continually.

Memory/Shift can be set up to automatically load and start up each of the programs when the PC is first booted, and also

has a 'cut and paste' feature allowing information to be transferred between programs. Most popular PC programs have been tested with Memory/Shift, but if users have any problems with their own software collections, then Software Suppliers are offering a 14-day money-back guarantee. Memory/Shift requires 30K of RAM and costs \$149 (rrp).





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Every DL2400 user raves about how they can load both single-sheets in a bin and continuous stationery simultaneously without needing to remove and install tractors or feeders. Computer paper is rear sprocket fed so that extra sheet is not wasted when you want to tear off your printout. Changing ribbons over is a snap with a choice of re-usable cartridges with inexpensive refills.

Users marvel at the DL2400 LCD character display operator panel which allows them to select and configure all printer features with full prompting.

The DL2400 even has a colour option. Sure it emulates the

IBM graphics printer but the DL2400 command set also includes all the options for setting different type-styles and modes.

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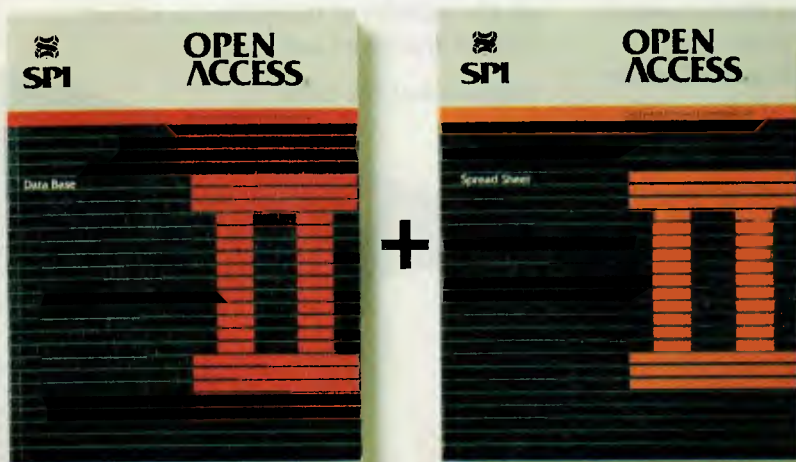
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# Souped up clone

IBM AT clones are cluttering the market. Representatives include Osborne's relatively sluggish AT, the somewhat zippier Sperry PC/IT and the supercharged Archives Micro Five. Against this varied array, President's recently souped-up AT is a formidable contender. Now turning over at 8MHz compared to its original 6MHz, the President has very impressive benchmarks. The company claims three to four times the performance of IBM's PC AT.

The unit tested had two floppy disk drives (1.2M each) and was fitted out with an optional 30M Seagate hard disk, 640K of RAM and an 80287 coprocessor to accompany its 80286 CPU. It also had Copam's IVDC (Intelligent Video Display Card) driving a high-resolution Taxan IV RGB monitor.

Given its eight long slots, you can load it with such goodies as a 65M streaming tape unit for backup and up to 15M of physical memory. Although not much use under PC-DOS, operating systems such as Pick and Xenix can offer real multi-user support with the extended memory capacity — but then so can the IBM AT. However, you will not find an IBM AT for \$3900 plus tax which is what President is asking for its 512K unit with two floppy drives (without monitor).

The system unit measures 54 by 44 by 17cm and may be mounted vertically in a floor mount. Internally it is similar to the IBM AT and accepts the same type of cards. The switching power supply may be set for either 110 or 240 volts and delivers 220 watts — adequate by any standard.

The keyboard is almost identical to an IBM keyboard, including the three indicator LEDs on to the far right. The 'feel' is a little lighter and may not be to the taste of a dedicated word-processor although the less fastidious among us should have no complaints.



*President AT: a formidable contender, said to have four times the performance of the IBM PC AT.*

There is no acoustic or distinct tactile feedback and the keyboard may be raked at two different angles.

The front panel features an AT-style key and a recessed reset button. I have a 'thing' about reset buttons, and cannot understand why so few manufacturers offer one.

The screen is particularly sharp and readable, due to the Taxan IV resolution and to the IVDC which delivers crisp well-formed characters.

Of the eight slots, five are available for expansion in the 'standard' system. Three slots are occupied by a display card (mono or color), a WDC/FDC controller, and a serial/parallel card.

My benchmark tests consist of the compilation and linkage of a PL/I program for locating prime numbers using the familiar Eratosthenes sieve technique. These two steps provide a disk-intensive test and test the CPU performance.

I recently reviewed the up-market Wang APC (PC Australia, June 1986), which uses the same processor and also runs at 8MHz. Not surprisingly, the Wang and the President ran neck and neck on CPU-intensive jobs (about four times faster than the IBM PC). The big surprise was the AT's disk-intensive performance — the President runs more than 40 per cent faster than the Wang (in its IBM-emulation mode) giving a net speed nearly seven times that of a regular PC. Note that none of these tests involved the 80287.

To test performance under a numeric coprocessor, I used a program which was written originally for a PC fitted with an 8087. It happened to be a graphics program displaying part of the Mandelbrot set in color. This produced something of a surprise. The President was only 15 per cent faster than the PC with the 8087 — probably due to the fact that the 80287 runs at only 5MHz.

The AT's ROM is the legal ERSO BIOS. The system is provided with

MS-DOS 3.10 and the usual utilities. A BASIC interpreter is optional. President claims that all of the most popular software packages run without modification and certainly none of those tested gave any hint of trouble. Generally, packages such as Lotus, WordStar and dBase III present little problem for close clones, and Flight Simulator is considered a more demanding test of compatibility, although it appears that Kings Quest (and Jet) run without a hitch.

The manuals are somewhat Spartan with a Taiwanese accent — they could stand an Australian rewrite. Nevertheless, there is plenty of information, both for the beginner as well as the expert user who wishes to program his own applications. The President AT is manufactured jointly by the Taiwanese firm, Copam and President's Queensland facility. It includes a 12-month warranty and a range of service agreements and is well equipped to provide service in most capital cities.

## PRESIDENT AT

### Australian Distributor

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100 George Street  
Hornsby 2077  
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### Basic Configuration

Processor: 80286  
Clock Speed: 8MHz  
Standard RAM: 512K (maximum 15M)  
Ports: 1 parallel, 1 serial  
Display: Green screen or high-res RGB  
Disk drives: 2 half-height 13cm  
Operating System: MS-DOS 3.10

### Benchmark Speeds (IBM-PC = 10)

CPU-bound 42  
Floppy disk-bound 12.5  
Hard disk-bound 67

### Ratings 0 (Poor) to 5 (Excellent)

Hardware Compatibility: 4.9  
Software Compatibility: 4.9  
Value for money: 4.5  
Documentation: 4.5  
Vendor Support: 5.0  
Maintainability: 4.9

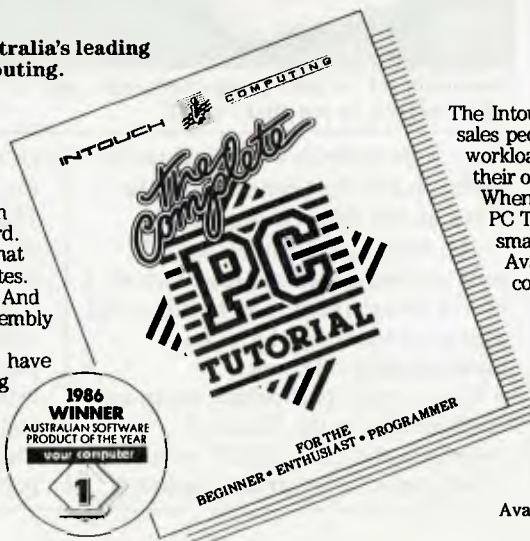
**Best points:** Speed, engineering quality, compatibility level.

**Minor gripes:** Documentation.

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— Les Bell, one of Australia's leading authorities on computing.

To add weight to Mr. Bell's observation, the Intouch Complete PC Tutorial recently won the 1986 Australian Software Product of the Year award. It is not surprising for a programme that can teach a beginner to use DOS in minutes. Have operators programming in hours. And have enthusiasts conversant with assembly language in days. Already this year, 10,000 Australians have improved their computer literacy using this program and the unique 'window' technique it uses. This allows the operator to use the application program on the screen and see the tutorial window simultaneously. It makes learning child's play.



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Turbo Pascal	88
Turbo Pascal 8087	124
Turbo Pascal BCD & 8087	150
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Turbo Pascal Toolbox	75
Turbo Prolog	149
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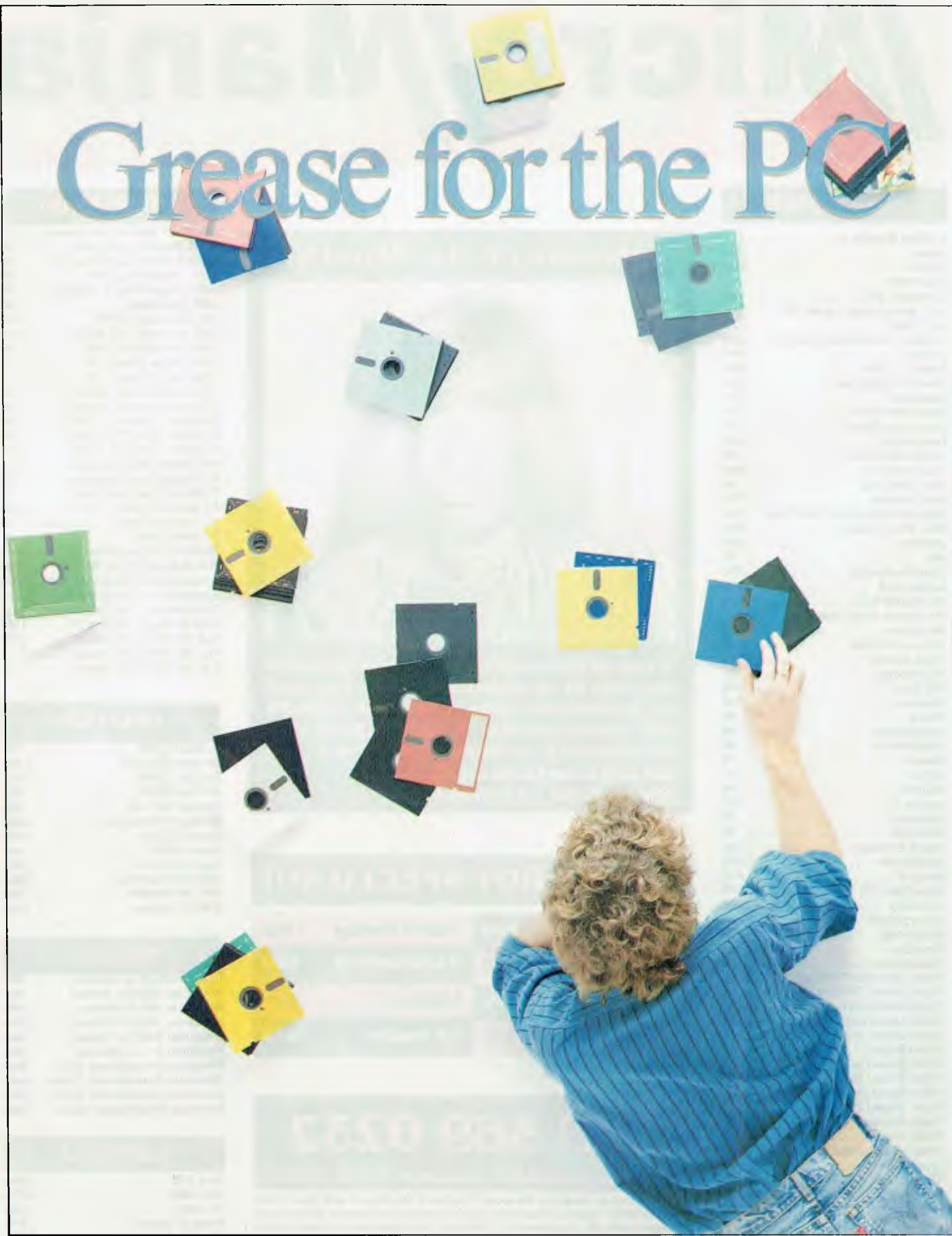
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# Grease for the PC





Utility programs make computer life worth living. They grease the PC wheels and can augment a single-minded application and make it a coherent tool. Software developers produce a flood of these programs each year for eager buyers. Although each utility may sell at a trickle, there is an abundance of them because they can be cranked-out quickly and are often fast-selling bonanzas requiring relatively little capital outlay. In fact, they probably represent the last bastion of backyard entrepreneurship.

Only after weeks of use can I surmise if a new hot utility deserves a place in the sun. Unfortunately, so many of them are fat zeros, requiring a lengthy learning process for minimal reward and demanding a tight fit into their particular straightjacket. What follows is a description of the latest crop of PC utilities. There are so many to describe and discuss that, alas, my analysis of each package must be more cursory than if I were dissecting a principal application program.

#### **Hard disk utilities**

The subdirectories within subdirectories of PC-DOS were a vast improvement over old CP/M user numbers, but brought with them some significant navigation problems. Even if you remember subdirectory names, once there are levels within levels the commands for manipulating files between directories become long-winded and error-prone.

The DOS TREE command will display all directories and the files that each contains. The information,

however, must be piped to a file or stopped and started repeatedly, as it scrolls too rapidly up the screen to be useful. Hard disk utilities are designed to more effectively examine structures and to permit clear passage through and manipulation of directories.

I-DIR was the first significant utility for hard disk management and still has a loyal following. It displays all subdirectory names within a window and permits efficient directory and file management operations. It comes with some nice features, such as an application menu system and a "batch builder" for step-by-step creation of batch files. It is a no-nonsense utility and has an interface that requires a good deal of concentration to master. It is slightly out of date in comparison with recent products.

The new crop of hard disk utilities display the tree structure in a diagrammatic way. This is more than cosmetic and gives you an understanding of how applications and data are grouped. The best selling utilities of this genus are Xtree, Direc-tree and Keeptrack.

Xtree scans your hard disk and takes about 20 seconds to report on 20 megabytes. Its menu is very attractive, especially in color, and the commands are logically and mnemonically presented. It allows you to tag groups of files for multiple copies and deletions and a convenient "move" command permits one-step copy and deletion of files. You can execute a file from within Xtree, which then moves out of the way and restarts when the application is ended. Any text file

can be viewed (but not edited) on screen and WordStar high bits are stripped from the display. It contains the fewest features of the group but is the most coherent and requires less mind-dredging to remember how it works each time it is invoked.

Direc-tree contains more features than Xtree but is a bit more complex to use. While Xtree uses mnemonics (\*C for Copy), Direc-tree uses a combination of function key and Control/function key commands. It does not have the same feel of simplicity as Xtree and offers too many ways of doing the same thing.

Like I-DIR, Direc-tree permits applications to be invoked from preset menus by a procedure that could not be more straightforward. Its main advantages over Xtree are that a text file can be edited (using cursor commands that are unique to the program) and macros of Directree commands can be, with significant effort, attached to Alt key combinations. It is slightly faster to load, taking 15 seconds for 20M. I have heard of, but not seen, a Direc-tree "Plus" upgrade that boasts increased speed, the ability to add descriptive notes to any file, the capacity to assign passwords to different areas of the tree and automatic timed backup of files.

Keeptrack is a combination hard disk and backup utility. It displays a visual tree and contains commands for file and directory manipulation that are slightly more complex than the other two. One of its nicest features is the ability to move a whole subdirectory at once as if it were a file. It is slower to scan the disk than the other two (40 seconds

The PC market is flooded each year with so many utility programs that Les Stein describes them as the last bastion of backyard entrepreneurship. In this article he looks at the latest crop of utilities.



for 20M). While Direc-tree keeps a picture of the tree structure in memory for rapid redisplay after returning from the execution of a program, Keeptrack and Xtree re-scan the hard disk each time.

The backup features of Keeptrack constitute a full-blown system that creates a mirror image of the directory structure on the backup disk. Backup information is stored in an index for quick verification of file location. Files that have been backed up have their backup attribute changed and, as a consequence, partial backups of new material are easily accomplished.

The combination directory management and backup functions of Keeptrack make it a very useful hard disk utility. The backup portion is not, however, as complete or effective as the special utilities dedicated to this function. The best of the present specialty backup programs are DSbackup, Backup and Fastback. They are quite similar in features and may be up to 300 per cent faster than plain DOS in backing up files. Fastback is copy protected (as is Backup), had a number of early bugs (reported in the Seybold Report of October 14th 1985) that have, as far as I can see, been rectified, and is the fastest of the group. I prefer

DSbackup because it has clearer screens, on-line help and allows you to interrupt the backup process if you need to format additional disks. All three, as well as Keeptrack, work well and there is very little to choose between them.

A newcomer to the hard disk management sweepstakes is The Norton Commander by Peter Norton, who brought you the Norton Utilities. It took me a concentrated hour — much too long — just to understand what the program was supposed to do. The manual is full of nifty but ambiguous phrases like "point and shoot" (read — execute a program) and has sentence structures that made the hairs on the back of my neck stand on end.

The Commander is a hard disk management program that does not display a visual tree but rather uses a window display reminiscent of I-DIR. Its uniqueness lies in the ability to allow two windows to be displayed at once, which can contain directory listings for two different drives or subdirectories. Any file can be viewed or edited but WordStar high bit characters are not stripped, making editing of such a file impossible. An interesting feature is that during the editing process, the ASCII value of each character is reported as the cursor moves on to it. The program can be loaded by a small "reloader", a 3K front end that swaps the main program in and out when needed, leaving the directory display on screen without hogging memory. The program also keeps previous DOS command lines on a stack that can be recalled.

I found The Norton Commander of limited value due to its non-visual display and poor manual. Having two subdirectory displays at once is useful in some operations but that advantage does not convince me that I would purchase the program. Recalling of the last command line is available to me through the public domain utility called NDOSEDIT, which does the job adequately and

has sat for years without expense in my AUTOEXEC.BAT file.

Just one more organising ability before we move on. PCEASY is a very new program that has the germ of a great idea. The idea is that every file can be given a 32-character meaningful name. PCEASY loads as a RAM-resident program that displays your applications in a list. Of course, you have to tell it the names and locations of each application. When an application is running, the PCEASY window can be "popped up" and any data or application file given a long descriptive name. The program uses the hairy cabinet-draw-folder conventions that never seem to make much sense in operation but it is not hard to find your way and there is full online help.

Error trapping in this first version is poor and an unfound application or improper directory path will get you in trouble. The display structure is unattractive but when I get deep into my fat subdirectory of obscure document names, I will no longer take a step without PCEASY guiding my hand.

## Disk disaster utilities

Being used to the facility to unerase CP/M files with the old DUU utility, I pounced on the Norton Utilities when they quickly followed the PC's introduction in 1981. These utilities allow you to recover files that have been erased (where the sectors have not been overwritten) and to carry out a whole range of useful and not-so-useful chores. The directory manipulation commands of the Norton Utilities will be largely superseded if you have one of the hard disk managers. The main benefit of the product lies in the unerase facility in the Disk Test, which tells you that a disk or file is in danger or potential danger and in the System Information test, which compares the speed of your processor with a standard 4.7MHz processor. Many a night I have huddled over the Norton Utilities



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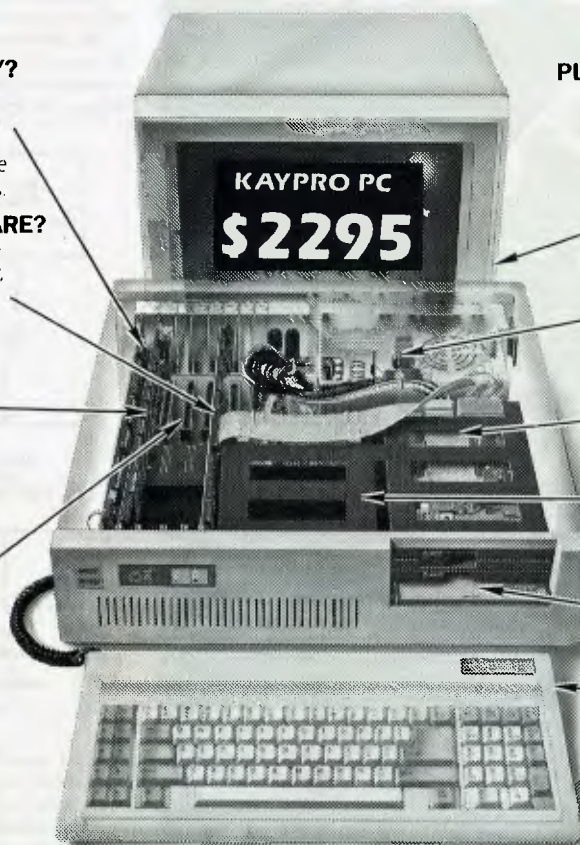
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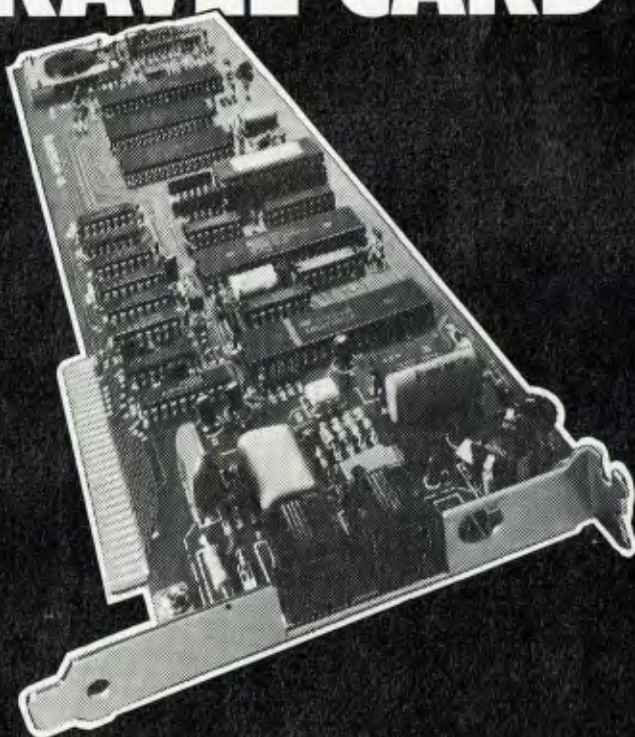
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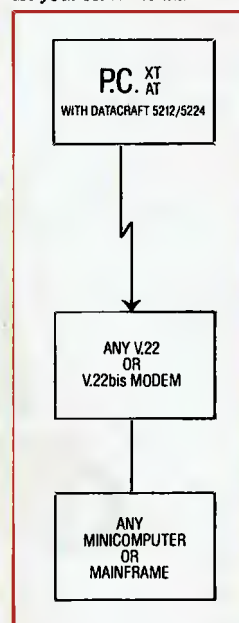
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## UTILITIES

manual nursing a disk back to health, much as I used Dr Spock when my first child developed an illness.

The latest version of the Norton Utilities (Ver 3.1) now guides you through each of the unerase processes and there is a new QuickUnerase facility that simplifies deleted file recovery.

Of all the utilities in the PC world today none gets my love and affection as much as the MACE + Utilities. These are as essential to a PC as electricity. The Norton Utilities report to you that you have a bad sector on your disk and will lock out that sector. Any file that was occupying that bad sector is essentially lost. The MACE Utilities will lock out the sector and will move the file to a new location placing any garbage at the end.

Why the MACE Utilities are so essential is that there is a tool to unformat a hard disk that has been accidentally reformatted. The revelation that a formatted hard disk can be saved was accidentally discovered by Paul Mace, a Silicon Valley wizard who moved to the backwoods of Oregon to do some new and creative work. He found that the accidental reformat only affects directory structures and he developed a brilliant system to put everything back the way it was. The MACE Utilities also offer comparable unerase facilities to the Norton Utilities. In addition, MACE has the ability to completely reorganise a hard disk by moving all the empty spaces to the back of the disk and rearranging the files to the front in a continuous grouping. When the condensing is finished, there is a marked speed increase as files are no longer fragmented over physically separated sectors.

The whole condensing operation took an hour and 40 minutes on a 20M hard disk packed to the hilt. A program called the Disk Optimizer performs this function in about one hour. The Disk Optimizer has two

parts, the first performs an analysis of how fragmented your disk has become; the second does the optimising. The MACE Utilities visually displays files on the disk being moved about and reshuffled. Disk Optimizer leaves you staring at a blank screen for an hour, which is disconcerting as I had ill-founded worries that something may have been wrong as it worked away in silence.

Disk Explorer is another helper utility designed for diskettes and is written in "cluster, track and sector" language. In the right hands this is a useful diskette analysis program that even allows you to reformat a single bad track. It should only be used by the kind of expert who has a good knowledge of the arcane esoterics of disk format analysis.

### Conversion programs

If you have no interest in moving CP/M files to IBM format and back again, you may as well skip to the next section. For those of you that have this need, there is an array of programs to choose from, all of which will get the job done. Understanding exactly how an IBM drive turns itself into a Kaypro drive is one of those issues I care nothing about. Nevertheless, my wife uses a CP/M machine (a Morrow Micro Decision) and I have a PC, so compatibility is essential.

Media Master, PC-Alien, and Xenocopy Plus will format CP/M disks for dozens of machine formats and will then move data back and forth to an IBM or compatible. Xenocopy is the grand-daddy of these programs and permits transfer to and from 50 CP/M formats, including 8in and 96TPI formats.

Crossdata does the moving but not the formatting. It is the fastest in transferring files from one disk to another by a factor of two. It is copy-protected by some super-complex scheme and cannot be loaded and operated from a hard disk. It comes with 29 CP/M formats, but you can define your own if you are clever. I

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attempted to do this for an Archives III machine but got lost in trying to decipher the Track/Side allocation scheme.

Media Master will not work on an old PC—I but aside from that it is a simple to use, flawless program that supports over 50 formats including such obscurities as a Wang Maws CP/M machine and a Groupil III. PC-Alien is even easier to use and, rather than being menu driven, turns the CP/M drive into drive “1” and the IBM into “2” making normal operations familiar and convenient. It is not copy-protected and is the least obtrusive and demanding. It is slow compared to Crossdata, but is comparable in transfer speed to Media Master and Xenocopy Plus.

None of the programs will work with Apple CP/M or Apple DOS disks and for this you need Apple Turnover, which consists of a special board to plug into a slot and some software. It works.

Moving data back and forth is especially handy if you have the same program (i.e. WordStar) on both machines. It may be that the program you need or have relied on for years is on CP/M format only. In this case you need 80mate, software that allows your PC to emulate a CP/M machine and run a program written for the Z80 or 8080 chip. Because every call and function must

be reinterpreted for MS-DOS programs, your application will run exceedingly slowly. Nevertheless, when you need it, you need it.

### General helpers

Software companies have been promising to organise us for years. Time management software, calendar programs and electronic appointment books have been dangled before us as a road to efficiency. SideKick, by Borland International, is the best known combination pop-up notepad, calculator and calendar. The program or ones of the same ilk are indispensable, and I await further improvements that add better interrelationship of the parts.

SideKick, Spotlight and PolyWindows, the three best sellers, are old news. A few new utilities have reached our shore that deserve special mention.

Homebase has been hailed as the best RAM-resident utility that exceeds the capacity of kindred programs. It is built around a database system, referred to as a “NoteBase”, which stores notes, addresses, phone messages and appointments. The telephone message pad and the address book use nice little forms for data entry. The calendar allows you to set alarms, make up a to-do list and scan appointments easily. There is a cut-and-paste function that does not work satisfactorily with WordStar. The calculator is adequate and there is also a terminal communication program that is adequate.

I cannot see what the fuss is about. Homebase is more powerful than SideKick because of database functions such as indexing. The manual is full of teeth-gritting language such as “(if you can’t figure out what to do) pick up a common kitchen fork, stick it in your disk drive and twist it around.” In consideration of the role that this variety of software plays in daily operations, Homebase is interchangeable with SideKick and similar programs for my use. SideKick is even easier to use as are

the PolyWindows components. Homebase is more powerful but clearly has more to wrestle with — perhaps too much more.

If you are a SideKick user, you must have heard of Travelling Sidekick. It comes with software and a massive diary called the “Organizer”. The diary is just too big and awkward for most people and contains much information of no use to us in Australia, such as US area codes, toll-free numbers and a color map of America. It has a bunch of pre-printed calendar and expense forms, which are themselves of no special interest or quality. I initially expected a whole “Time Manager” set up, related to the system of that name that is used so effectively here and in the US. Instead, I got a big black book without much in it except blank pages and a manual on how to use the program.

The Travelling Sidekick software has two functions. It has a pre-designed address data entry form and another for entering engagements. It will print out an address list and a phone list to fit in the Organizer. It can print out a daily, weekly, monthly or yearly calendar and it can even do labels. It will convert address files from SideKick to Travelling Sidekick and the engagement section will work with SideKick’s appointment calendar.

If you use both the appointment calendar and address list functions of SideKick extensively and must take them on the road, this is the way to do it. I would have preferred that these printing functions had been included in SideKick itself, and perhaps the binder sold separately. Travelling Sidekick software just really makes up for the inadequate printing functions of SideKick.

The cleverest utility idea of the year is a little program called Smart Notes. It is based on the popular little yellow “Post-It” notes which you can stick anywhere. Smart Notes is a RAM-resident program that will allow you to pop up a little note and attach it to any text on the screen.



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## UTILITIES

Notes are entered in a little box (the size of which you can vary) that appears on the screen with an arrow head pointing to a place in your word processing document or spreadsheet. The notes are then "glued" to the document and can be popped up or edited at any time. The program works by storing each note with a pointer to the last 47 characters back from its position within a file. Notes can also be listed and printed separately.

Unlike the SideKick notepad that generates a separate document unrelated to your text or spreadsheet, Smart Notes specifically relates your notes to an exact spot in a file. This program has stuck to me like glue and I constantly use it as ideas spring up related to a passage in progress. I also use it to attach notes describing file contents during a directory listing. I wish I had thought of it.

### **Last but not least**

Speed and efficiency are the rationale for all the utilities but the desire to out-feature competitors often makes programs that rival applications in complexity and consequent sluggishness. A utility that completely fulfils the rationale of speed and efficiency is a simple program called Lightning. It has no connection with Turbo Lightning, the background spelling checker.

Lightning loads into memory before any other program and reserves some available memory as a buffer. When you access a disk it will copy the sectors you used into the buffer. The next time you access the same sectors, Lightning will supply it from its buffer at the speed of RAM. It is said to "cache" memory. The program can also take advantage of expanded memory and you can set up a massive multi-megabyte buffer that will speed up your work dramatically. For example, a recompilation of a 150K source using a C compiler took 40 per cent less time. At the end of the day or at any time, Lightning will tell you how much time it has saved. If its figures can be believed, and I think they can,

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For example, AT A TOUCH you can AUTO-DIAL your Videotex database to logon, select the Telex option then IMPORT a previously prepared text file, send it as a TELEX and then save all of your PERSONAL MAIL direct to disc or have it printed out!

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## UTILITIES

at the end of the day the operations on my PC have usually been speeded up by 80 per cent!

Lightning has become essential to me and would be crucial to any programmer who has a repetitive task such as source editing or compilation. If I had to be stuck on a desert island with a small list of software, Lightning would be high in priority.

Lightning, the MACE + Utilities and Smart Notes bolster my faith that there are better ways and new ways of doing things, and they also prove wrong the notion that the more things change, the more they stay the same.

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# The WordPerfect library

WordPerfect sits at the top of the word processing heap. It is a bit more fussy than old bludgers like WordStar but has superior features and formatting control.

WordPerfect, Inc (formerly SSI), the makers of WordPerfect, has now introduced the WordPerfect "library" — a collection of utilities to supplant SideKick-like programs and add to the convenience of an already superb product.

A RAM-resident "shell" is loaded before any application. The shell has a menu that lists WordPerfect and MathPlan (the stand-alone spreadsheet and character graphics program from WordPerfect Inc). In addition, there are menu items for a Calculator, Calendar, File-manager, Notebook, Program editor, Macro editor and a game called Beast. You may add as many programs as you like to the shell menu so it can function as an all-purpose front end menu.

The shell is not a concurrent program environment such as Microsoft Windows or TopView. You can use it to load WordPerfect or MathPlan and then jump out of either program to one of the utilities. For any other non-WordPerfect application, you must exit the program to return to the shell and invoke a utility. The shell can use expanded memory and load the utilities into the area above 640K if the application is hogging full DOS memory.

The Calculator is, unfortunately, not aesthetic or even cute. It does, however have a much greater range of functions than other SideKick clones. It offers special manipulation of financial variables (interest, profit margin), and programming functions to compute the complement of a number in hex, octal, decimal or binary, and can shift and rotate bits. There are scientific equations for

velocity and surface area and trig and log manipulation. There is even a good range of statistical functions.

The Calendar is simple to operate and permits you to enter and scan appointments and to attach memos and "to do" lists. The File-manager does not offer much more than the facilities already in WordPerfect word processing except the ability to save a text file to a Clipboard. The Clipboard can also grab text up to 5K in size to move to another application.

The Notebook is a decent flat file database with the fields on top and the data listed horizontally. It can display a list, sort it alphabetically and can jump from any item on the list to the full record of information. The record display form is easily designed. Any phone number on a list can be dialled through your modem if you have that facility.

Macros in WordPerfect word processing are saved as separate files on disk, named after the macro keystrokes. For example, you may group a complex set of commands onto Alt-W and it will be saved to disk as ALTW.MAC which, unfortunately, leaves you little idea as to its apparent function. The Macro Editor included with the Library will allow you to examine the macro, edit it, and see what it does. It takes a bit of getting used to but will be invaluable to WordPerfect users.

There is also a Program Editor for ASCII source files, which is a decent scaled-down version of WordPerfect but without the features of the great program editors such as Brief. Finally, there is a PacMan type game called Beast that is worth about two minutes. It must be one of the few games that runs on a monochrome monitor.

The only problem with these utilities is that they have to be swapped back and forth to disk. It is

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## Crossdata

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## Travelling SideKick

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## HomeBase

DBMS  
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Melbourne, 3186

## Smart Notes

Personics Corporation  
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Concord, Ma. 01742

## The WordPerfect Library

Sourceware  
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only the shell that remains in memory and there is a small but annoying wait to call up utilities such as the Notepad or Calendar. Even with my souped-up PC and voice coil hard disk, the wait is just enough to deter me from flipping between WordPerfect and a Library utility.

If you work with WordPerfect for a good part of the day, the Library is a great investment. If you mainly use other applications and need WordPerfect only occasionally, you could give it a miss. It is a very good implementation of a set of RAM resident utilities that will continue to improve. WordPerfect is bound to make it better and better.

## Stein's choices

Xtree is my first choice for a hard disk manager. It is fast, attractive and, most importantly, operates on the principle that its commands should be self-evident. Keeptrack is a second choice because it has built in backup facilities

As for conversion programs, PC-Alien is slick and unobtrusive. It is the program I would choose for occasional use. If I constantly required CP/M to IBM transfers, Crossdata is the fastest, although a clear second choice because I cannot load it on my hard disk.

The MACE+ Utilities are absolute winners. There is nothing comparable in the PC world, and Lightning would be another first choice as it leads to dramatic speed increases at a minimal cost. Next would be Smart Notes, the "post it" pop-up notes that make annotation of files so convenient.

Out of all these, the MACE+ Utilities are a clear champion. They are PC life insurance. Second on my list would be Lightning to speed up existing applications and give me power without much cost.

# THE PERFECT



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# Mass storage mania

Susan Janus finds that the increasing abilities of PCs are creating a voracious appetite for storage space and faster access



As the line separating the computing power of microcomputers and minicomputers grows steadily finer, the mass-storage industry appears to be reaping the most benefit. Microcomputer memory continues to grow by leaps and bounds, carving openings for not only more applications but more powerful ones. The result is a voracious appetite for ever-larger helpings of storage capacity, and a demand for faster and faster access to stored information.

Networking is also contributing to the boom in mass storage. Hooking micros to minis to mainframes is the great computer challenge of the 1980s and as systems designers answer that challenge, the networks they are designing will require ever greater amounts of storage capability, as well as greater flexibility in exchanging stored information within and between systems.

Storage for microcomputers has come a long way since the days when the lowly 143K direct-access floppy

disk was hailed as a huge advance in data storage and retrieval. With the introduction of the Winchester hard disk, PC users acquired the ability to store and access growing numbers of applications and data, quickly and easily. But what they gained in increased capacity and speed, they lost in media removability and interchangeability. Enter Bernoulli technology, and the development of other types of removable media, both for on-line storage and archival storage.



Anyone who has ever suffered the "crashing" defeat of a hard-disk head crash, where weeks or even months of hard work disappear down "black holes" gouged in the disk by an errant head, understands the proliferation over the last few years of tape and other kinds of data-backup systems for micros.

Time is money in any business, and for those reluctant to spend the time installing and using a backup system, there is no more unkind reminder of the necessity of such a system than the irretrievable loss of many work hours.

Until recently, all mass-storage devices have relied solely on magnetic media. Now research and development in the area of laser-based systems, where light is used to write and read disks, promises storage capacities beyond our wildest dreams. The gigabyte, 1000M, may well become the standard volume measuring unit of the future.

The success of the hard disk in raising storage capacity while giving users the access and transfer speed they crave is well known. Now, in keeping with the high-technology tradition of packing more and more powerful goodies into smaller and smaller packages, there is a new standard brewing in the low-end of the hard-disk drive market.

And following another kind of tradition, it is a standard that looks like it will be set in stone complete

with the IBM stamp of approval.

"I fully expect IBM to go to a 3½-inch 20M Winchester this year," predicts Jim Porter, who follows the disk-drive industry and is the publisher of DiskTrend Reports in America.

Porter says his assumption is that in the third quarter of this year, "IBM will start to use the 3½-inch Winchester in the XT. They may also bring out a small footprint desktop using 3½-inch Winchesters."

Porter cites statistics that show that 3½-inch low-capacity Winchesters (up to 30M capacity) have been making steady gains on 5¼-inch drives for the past three years. In 1983, he says, manufacturers shipped slightly over one million 5¼-inch drives, and 1500 3½-inch drives. However, in 1985, manufacturers shipped three million 5¼-inch drives and 304,000 3½-inch drives.

This year, Porter forecasts about 3.5 million 5¼-inch drives will be shipped, while slightly more than one million 3½-inch drives will go out the door.

He also says that if his underlying assumption plays true, and IBM does come out with a 3½-inch Winchester drive this year, then in 1988 the tables will be turned in the low-end Winchester drive market. Porter's figures paint this picture for 1988: 5¼-inch drives — 2,357,000 units shipped; 3½-inch drives — 5,010,000.

## Legend lives on

IBM's power to impact the low-end disk market is legendary, and the recent price cuts it has made on its own hard disks are no exception.

The prices cuts, according to Porter, are designed to give IBM a bigger share of its own system's disk-drive market, in the aftermarket.

"To give you an example of what's occurring there," he says, "the leading producer of low-end OEM 5¼-inch drives is Seagate. Seagate in its last quarter reported revenue of roughly \$125 million. The way it broke down its sales, 16 per cent of its revenue went to IBM, 19 per cent to other system OEMs, and all the remainder,

roughly two-thirds of its revenue, went to distributors and dealers.

"Now, that means that they're selling two-thirds of their disk drives, roughly, into the PC aftermarket. That's business IBM hasn't been getting. Dealers have been buying the systems from IBM without the hard disk, and they've been dropping in [whoever's] disk drive."

By cutting prices on its own hard-disk drive, IBM is making such practices look less attractive to dealers. "I would guess dealers are making about \$US50 to \$US100 by doing the drop-in thing now," says Porter. "But any time they can increase their trading margin at all on an IBM system, they'll do it. They'll continue to do this until IBM changes the attachment opportunity completely, which they may do later this year when they bring out their 3½-inch Winchester."

## Spreading influence

Porter cautions that IBM could easily spread a thicker layer of influence on the low-end hard-disk drive market. "You've got to recognise that you're dealing with an area which exists at IBM's pleasure," he says. "They may decide to adopt certain strategies which will let them take the disk-drive business rather than the outsiders. For example, if they price their system the same with a disk drive or without it, guess which way the dealer's going to have to buy it? Or they could create some new upgraded models in which the new features were available only on the models with disk drives included. That would tend to get rid of this aftermarket opportunity also."

Elsewhere in the market, one of the newest, hottest, and fastest growing segments is the hard disk on an expansion card.

Noted for its ease of instalment, a card-mounted hard disk offers users an alternative to what Porter describes as the "technical boondoggle" of setting up a storage system.

"Drives on a card are almost self-installing," he says. For upgrading systems already in users' hands,



they are the "best thought-out solution." With storage capacities generally set at 10M or 20M, most hard-disk cards are competitive with traditional Winchester in speed and performance.

#### Growth market

The medium and high-end Winchester drive market, 30M to 100M, is a huge growth market, but this market "is not as dominated by IBM," says Porter. His figures show that the 30M to 100M 5¼-inch drive market grew from 42,000 units shipped in 1983 to 699,000 shipped in 1985.

The growth of the high-end market is right in step with an ever-increasing average disk-storage capacity, which almost predictably doubles every two years, according to statistics from InfoCorp, a market-research company in Cupertino, California. Hard disk standards have expanded from 10M in 1984 to 20M in 1986 and 40M are predicted for 1988.

Increased speed and capacity requirements of LANs, multi-user PCs and workstations have also played a key role in giving high-capacity drives a tremendous boost in sales.

Priam is an OEM disk-drive manufacturer that has targeted a combination of the upper end of the micro market and the lower end of the minicomputer one, a market largely made up of personal workstations.

"Our current product line starts at about 40M formatted and goes up to about 330M," says Dick Reiser, vice president and general manager of Priam's Systems Division.

Reiser says pressure "to make the box smaller" will ultimately bring the 3½-inch standard to the high-capacity disk-drive market. But, he says, it will be at least two years before the technology succeeds in cramming higher capacities onto a smaller circumference.

To cope with that problem, he says, the disk-drive industry has changed its approach from increasing the tracks per inch on a disk to increasing the bits per inch of the tracks themselves.

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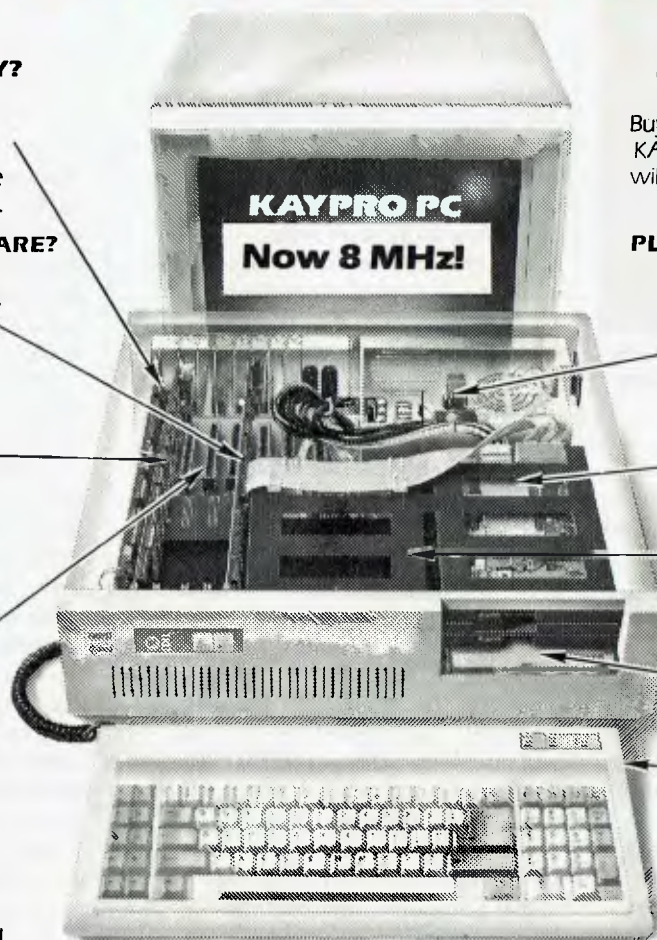
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That change in approach will allow them not only to increase the density of a disk, but also to speed the transfer rate, says Reiser.

The standard storage capacity in this part of the market — the top of the high end — he says, is already well on its way to 60M. And, he adds, his market's constant demand for more storage will keep Priam "standard higher."

Another tactic Reiser cites in the frenetic race to meet the demand for more storage — and to meet it without pushing costs through the ceiling — is to change the code on the disk-drive controller boards.

"The industry is switching over to RLL [run length limited] codes, which reduce the clocking information on the disk, changing the ratio of clocking-to-data," he says. The consequence is that "you can effectively increase the amount of data stored on the disk by 50 per cent just by changing the code."

Reiser agrees that the growth in networking promises bigger and bigger sales for Priam. "Once you decide to share information, then you realise you have a lot more to share than you thought you had, and it grows like Topsy," he says. The growing demand for friendlier interfaces also makes Reiser happy. "We're in another era with the personal computer," he says.

Because it is used more and more for "personal productivity"

applications, there is a demand for interfaces that "make it easier for the non-computer oriented user" to get the job done.

"Those interfaces require more storage. The result is a significant increase in the demand for higher capacity systems," says Reiser.

As the Small Computer Systems Interface (SCSI) becomes one of the key players in the slow movement toward standards in the microcomputing world, mass storage subsystems incorporating SCSI are becoming more numerous.

Addressing important mass-storage concerns like speed, compatibility, ease of installation, and expandability, SCSI disk and tape subsystems are also part of a very strong trend toward "intelligent interfaces on peripheral devices," according to Leonard Laub, president of Vision Three Inc., a Los Angeles consulting firm specialising in mass storage technology and systems.

"What SCSI allows you to do is string together a lot of devices which are either slightly different or vastly different," Laub says. "For instance, it is possible to connect, on the same SCSI bus, an optical-disk drive that writes, a Winchester, a CD ROM drive, and, increasingly, things which are not even storage devices, like printers. That makes it possible to bundle up some of the functions which don't need the constant intervention of the CPU."

The significance of SCSI from the point of view of someone who is configuring a system, says Laub, is that in the past tape drives and every kind of floppy-disk drive and Winchester have all had their own kinds of controllers.

"But now, when the tape drives, disk drives, and floppies have SCSI controllers built into them . . . the SCSI interface is the same for all these different types of devices," he says, "which means that you can stick a bunch of these disparate devices together with one controller in the computer, called the host adaptor, to bring out the computer's bus to the SCSI interface. From that, you can go

to as many as eight storage devices, all daisy-chained together, all tied to the same bus. This is a quantum leap in the ease of ability to stitch together systems."

### Positioned for two markets

AST research Inc., of Irvine, California, has developed a family of SCSI-based storage devices, with both 5¼-inch and 3½-inch formats, that are positioned both in the IBM PC market and the Apple market. Wei Szeto, vice president of new business in AST's subsystems group, is clearly impressed with the advantages SCSI architecture has given AST in the areas of technical development and marketing.

"In the old days, depending upon which computer system and which application you were working with, you always had to use a special controller to talk to the disk drive," Szeto says.

"For the disk drive, for the tape drive, for the optical-disk drive, for these storage devices to really talk to the systems effectively, you had to develop a unique controller. So for every application, if you had to work on a controller, it was a very long, time-consuming, and tedious kind of development. So you couldn't really react to the market very quickly."

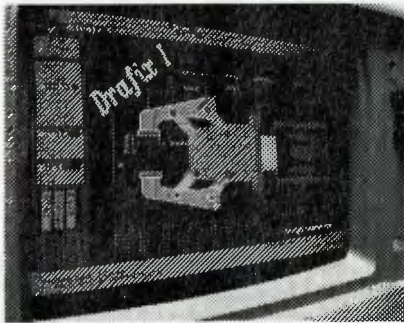
The implications of SCSI architecture to mass-storage users with inexhaustible demands for ever-higher storage capacity are significant. Expansion units can be easily daisy-chained together as the storage needs of the user grow and other SCSI peripherals can be added to the system without using additional PC slots for controllers.

"The SCSI environment gives the user flexibility, a far bigger choice for future upgrade and enhancement," says Szeto. "SCSI may mean nothing to the user when he buys a system, but a year from now it may mean a lot. There may be all sorts of other elements that are SCSI-compatible, like optical-storage devices offering him far more storage capability, or like printers and scanners. There are a lot of advantages to him that are not



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immediately apparent. The possibilities are literally unlimited and that's the beauty of such an intelligent architecture."

In the past, as the storage capacity of Winchester hard disks seemed to grow with each passing day, users soon found themselves with enough data to fill a room full of floppy backup disks. The end result: the current surge in sales of tape backup systems.

Important for data exchange and distribution, as well as for data security, tape backup for microcomputers is most commonly found in 5¼-inch cartridges with capacities of 45M to 60M.

IBM's recent introduction of a quarter-inch tape cartridge drive for its RT PC was hailed by many in the backup industry as the final stamp of approval needed for wider acceptance of quarter-inch tape as a backup system.

Maintaining reliability while continuing to increase density is the challenge tape-drive technology developers face as they seek to satisfy the demand for more storage. While boasts of 800M of storage capacity on tape have been heard from developing labs, industry sceptics believe it will be another story getting those drives from the lab to the working PC market at a reasonable cost.

And, just to keep things from getting dull in the tape-backup

market, an import from the mainframe world, half-inch cartridge-tape drives, may be available to the microcomputer world by the end of this year. Because data does not have to be packed so densely on half-inch tape as it does on quarter-inch, the half-inch systems will offer higher capacity without sacrificing reliability. Half-inch drives for micros are expected to offer storage capacities starting at 250M.

Videotape and audiotape storage systems are vying for their share of attention in this market, as well. But probably the most sought-after, long-term goal in mass storage — the peak of the mountain which everyone is struggling to reach — is true random access to vast stores of information. Optical storage technology, many experts agree, is mapping the shortest climb to the peak.

While Winchester hard disks will continue to dominate the on-line storage market for at least several years to come, developments in laser-based technology may well give Winchesters some stiff competition, perhaps as early as 1988. And the key to opening the flood gates of the mass storage market to laser-based systems, analysts say, is the development of erasable optical media.

CD ROM disks, read-only optical disks storing about 550M of data, are already in use as electronic publishing store-houses for encyclopedias, professional directories and other large databases. Write-once disks, storing up to a gigabyte (a billion bytes) per surface, are used in large-scale image storage and, most recently, for backup and data distribution in huge volume systems.

Tallgrass Technologies, for example, manufactures a 200M per side, 5¼-inch write-once optical-disk drive made by Optotech. Neither the CD ROM nor the write-once disk can be erased or rewritten once the laser has imprinted the surface.

However, both Porter and Laub agree that once an optical disk is developed that can be altered as easily as magnetic media can, then the high capacity, rugged removability, and

low cost per megabyte of the disks will become powerful competitive edges over magnetic media.

## Far-reaching consequences

Laub sees even further-reaching consequences with the development of optical disks that can be written over without being erased first.

"What will cause optical to break into the true mainstream of the PC market is the availability of truly high-performance, truly over-writable optical drives," he says. "When it comes, it will give you a product that will do everything that a Winchester does right now, and it will also have a removable medium. It will have more capacity than a Winchester of similar price. The result will be the combination of the functions you expect from a Winchester, plus more capacity, plus no need for a separate backup device."

These far-reaching developments are several years down the road, but the message is loud and clear. Magnetic media will be challenged to a tough race for the dominant share of the mass-storage market. The question is, will one of the contenders be racing at the speed of light?

For those who are in the market to buy mass-storage systems, the picture gets rosier day by day. Higher capacities and improved reliability at lower prices is clearly the trend. Drive enclosures will get smaller and smaller, adding to the convenience of incorporating storage systems to the PC workplace.

For the sellers in the market, the heat is on and there is no sign it will let up. Demand for higher-storage capacities is relentless, and competition to see who can provide the most volume at the fastest rate for the least cost will push technology — both magnetic and laser — to the limits.

Who will be at the top of the pile when the dust finally settles? Perhaps the best guess is that it will be those keeping the sharpest look-out for that illusive "emerging microcomputer standard" we have been hearing about for so long. ■



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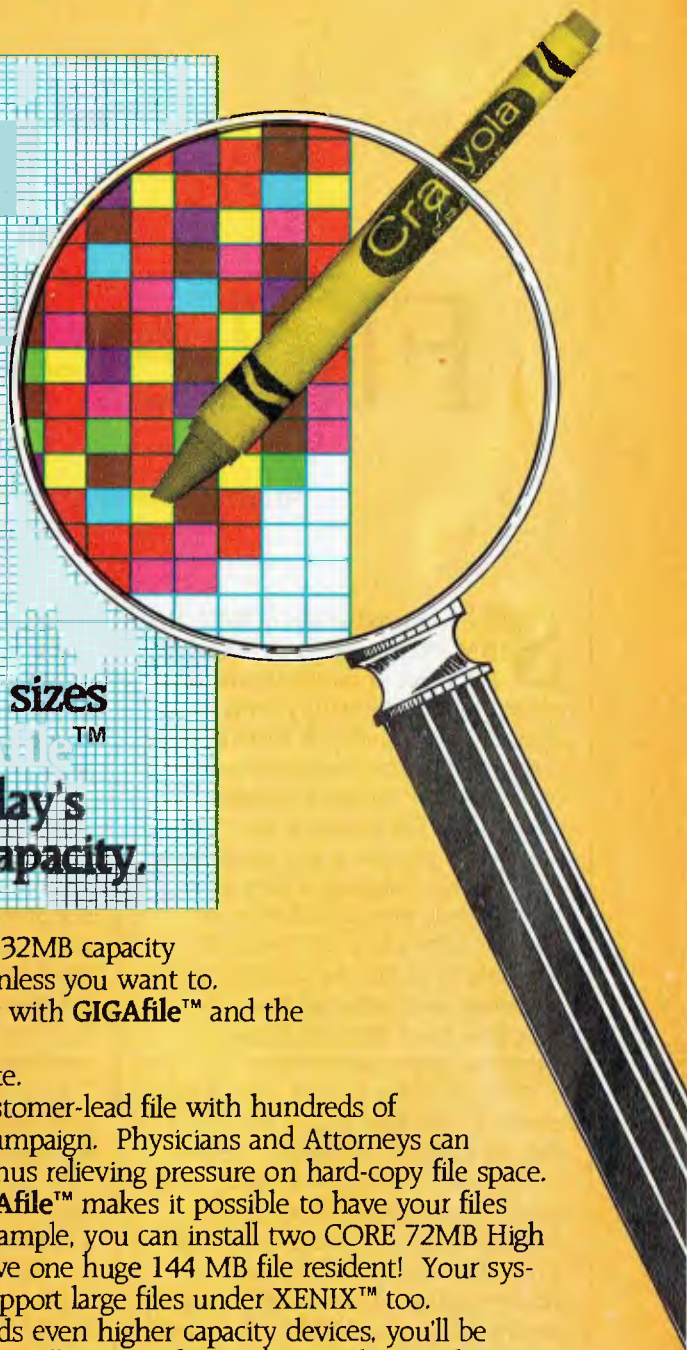
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# Flicker-free graphics

Augie Hansen goes behind the mono and color screens to look at the best way of sweeping away the snow

Since its introduction in 1981, the IBM PC has been offered with the choice of monochrome or color/graphics display systems. Initially, the majority of systems were configured for monochrome only because it was the less expensive alternative. The situation has changed dramatically in just a few years. Now surveys and estimates of new sales show a more even distribution of monochrome and color/graphics displays. Both may be installed on the same machine, although most programs are written to display output to only one at a time.

DOS provides a set of routines that establish the video mode, write data to and read data from display memory, and perform a variety of related tasks. IBM recommends that program designers use the routines provided with DOS and in ROM BIOS to achieve portability of programs both to new versions of DOS and to new members of the PC family. In IBM terminology, programs that adhere to the DOS/BIOS interfaces are "well behaved." The penalty for good behavior is a slower execution for screen-intensive applications because of the high overhead associated with the DOS and BIOS calls.

An inherently faster way of updating the screen is to write directly to its associated memory. A convenient way of managing the screen is to keep off-screen buffers in

the program's data space and to use a block-copy routine that quickly shuffles a memory image to physical display memory. For the monochrome display adaptor, this strategy causes no problem. It also works for the IBM Color Graphics Adaptor (CGA) in any of the graphics modes. However, in either 40- or 80-column text mode, the original CGA is a problem because, unlike the monochrome adaptor, the CGA exhibits visible interference when a program tries to access display memory while the screen is being updated.

One way to avoid this interference is to synchronise the display accesses during reading and writing operations with the time periods within a display refresh cycle that are considered safe. The safe times are the horizontal and vertical retrace periods of each displayed frame. Another involves blanking (turning off) the raster scan while the display memory is being written to. Each approach has advantages and disadvantages.

## Display adaptor basics

The screen interface package can be best appreciated by first understanding why the CGA retrace periods are the only safe times for display memory accesses. (This discussion does not apply to the IBM Enhanced Graphics Adaptor because it uses faster memory devices and

additional logic that precludes problems with simultaneous access by the CPU and video refresh circuitry.)

The memory on the display adaptor is placed within the address space of the central processor. The CGA memory begins at B800H and extends upward for 16K, enough for one high-resolution graphics screen (128,000 pixels), or four screen pages in 80-column text mode. Text mode is the focus here.

Figure 1 shows the horizontal sweep signal, the signal within the device that is responsible for the horizontal deflection of the electron beam that paints the screen. The figure depicts one horizontal scan period. The dependent axis (up) is the beam deflection as a function of time shown along the independent axis (across). On a computer display, the screen image is *underscanned*. The image is completely visible within the normal viewing area. The result is a framed picture with a border. (In contrast, television sets use *overscanning* to make the image bleed, that is, leave no border.) The beam is turned off completely during retrace to avoid leaving unwanted residue on the screen.

The IBM display is noninterlaced, which means 262.5 horizontal scans occur per frame (one full screen image), and 60 frames occur per second. With 15,750 horizontal scans per second, each takes about 63.4

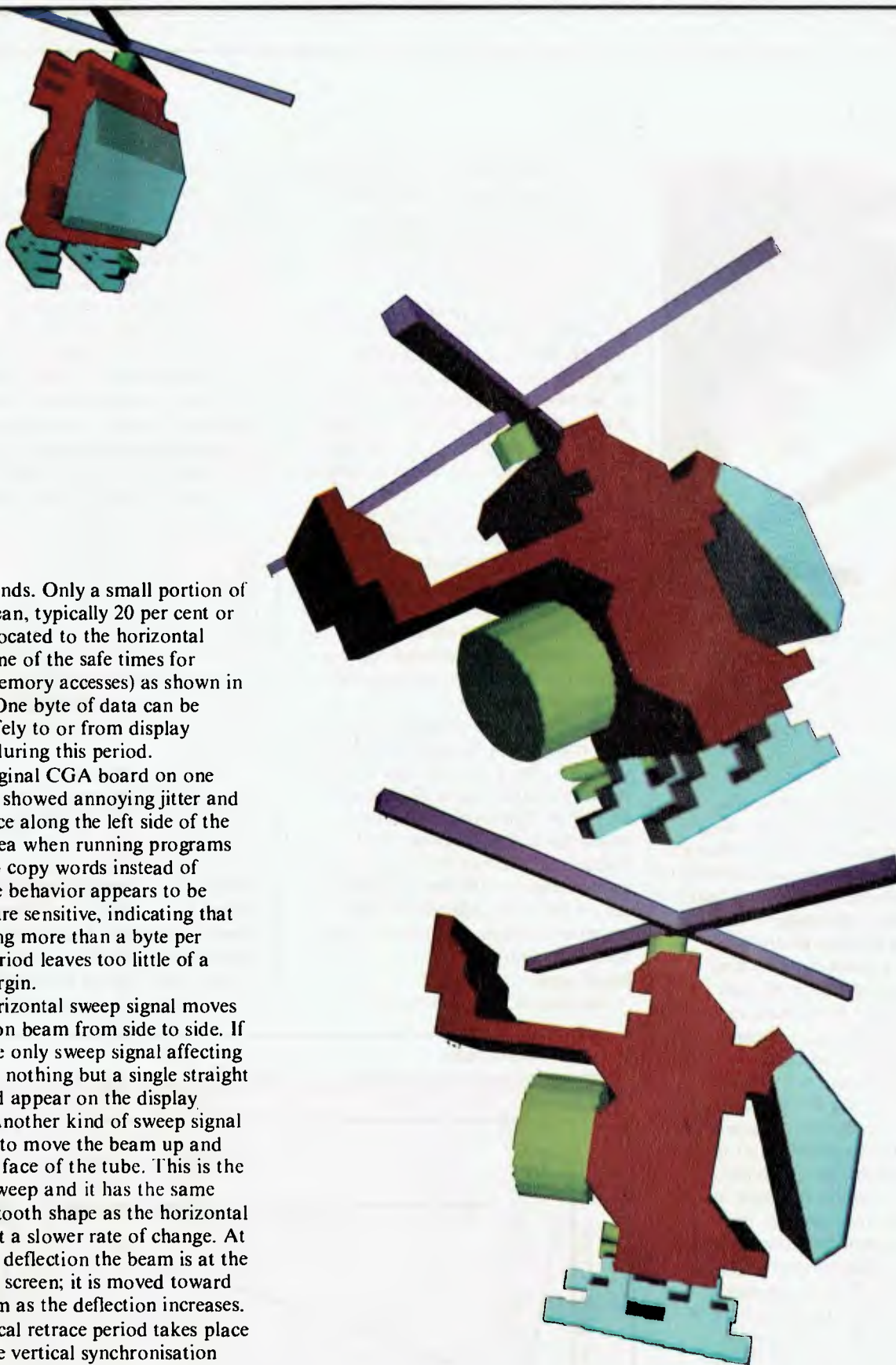


microseconds. Only a small portion of a single scan, typically 20 per cent or less, is allocated to the horizontal retrace (one of the safe times for display memory accesses) as shown in figure 1. One byte of data can be copied safely to or from display memory during this period.

The original CGA board on one tested PC showed annoying jitter and interference along the left side of the display area when running programs that try to copy words instead of bytes. The behavior appears to be temperature sensitive, indicating that transferring more than a byte per retrace period leaves too little of a safety margin.

The horizontal sweep signal moves the electron beam from side to side. If it were the only sweep signal affecting the beam, nothing but a single straight line would appear on the display surface. Another kind of sweep signal is needed to move the beam up and down the face of the tube. This is the vertical sweep and it has the same basic sawtooth shape as the horizontal sweep, but a slower rate of change. At minimum deflection the beam is at the top of the screen; it is moved toward the bottom as the deflection increases.

A vertical retrace period takes place during the vertical synchronisation pulse period at the end of each frame. During this time, the electron beam is blanked and moved from the lower right corner of the screen back to the





upper left corner. This period is long enough — a little more than one millisecond — to permit a block of 250 data words (character and attribute pairs) to be transferred to or from display memory without interference.

#### Video interface

The first decision made in this design was to use a buffered screen interface; that is, an image of what is to be sent to the display is assembled first in the program's own data space. When complete, the image is copied as quickly as possible to display memory via a block-copy routine where it is periodically repainted on the screen by the raster-scan logic.

Many programs use an unbuffered approach, which is adequate for most purposes. Characters are written into display memory via DOS and BIOS routines, but no memory image is retained by the applications program.

Most advanced microcomputer users want an instant response in screen update; for example, they expect a command selection from a menu to be displayed as soon as the key is released. Such a response is attainable with a modest amount of programming. As noted above, however, portability to machines other than the IBM PC may be sacrificed; special versions of the screen-interface programs may be required.

The routines described in this article assume that programs calling them already have done an equipment inventory and set up the display system in the 80-column text mode.

Available methods of synchronisation depend on the use of the status register at I/O address 3DAH. This is a read-only register on the CGA that has two bits of interest to the block-copy routine: when bit 0 is high, it indicates that a horizontal retrace is in progress; when bit 3 is high, it indicates that a vertical retrace is in progress.

As noted, single bytes can be written during horizontal retrace periods, and large blocks of data words can be written during vertical retrace periods. To compress the time needed to transfer a screen image, the two approaches are merged using a combination of the horizontal and vertical retrace period.

The mode control register, a write-only register at I/O address 3D8H on the CGA, has a bit that may be reset (to 0) to disable video. Bit 3 must be set to 1 to turn on the beam that paints the screen. Turning off the beam is an effective way to prevent snow. However, the beam cannot be left off for more than about three character rows of data before flicker becomes apparent.

#### Block copy

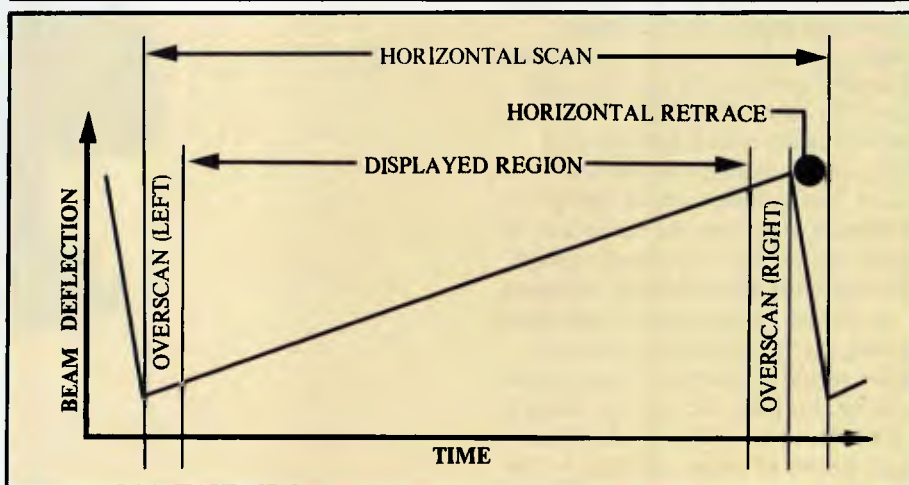
The instant screen method

described here uses a memory buffer that holds the same amount of data as one display page on the standard CGA. The block-copy routine, CPBLK.ASM (listing 1), copies the contents of the memory buffer to display memory only during safe times. The memory buffer has 4000 bytes: 2000 are for characters (25 rows by 80 columns) and 2000 hold the attributes associated with each character. Display memory has 4096 bytes per page (four pages in 80-column modes), but the last 96 bytes are unused by most programs.

The source code for **cpblk** is coded with conditional pseudo operators and, therefore, must be assembled using a macro assembler that recognises Microsoft assembler pseudo operators. Alternatively, the conditional assembly lines can be removed and the file edited for customisation to individual compilers used for the C language parts of the package.

An image is copied from application memory to display memory in blocks. Six blocks may be copied in one-tenth of a second. Each block has two parts. A full 240 words are copied during the vertical retrace period in one string move operation. Another 94 words are copied as single bytes, one per horizontal retrace period. These values are based on both calculations and empirical

Figure 1: Raster scan





measurements and are conservative enough to work with a worst-case display adaptor without interference.

Interrupts are turned off only during the critical time when **cpblk** is waiting for the start of a horizontal retrace period. This is done because even the slightest delay (by a keyboard or clock interrupt, for example) could cause a display memory write at the wrong time. The vertical interval is relatively long and it has enough of a safety factor for the number of words that interrupts are left on. If interrupts were turned off during the vertical retrace period, problems would result for other programs, such as the clock update routine and resident utilities.

#### Double buffering

To produce the snappiest performance from this display interface technique, programs should use an in-memory screen buffer that is updated out of the user's view, then copied to display memory as quickly as possible. A method of achieving nearly instant CGA updates is called *double buffering* because two levels of buffers are maintained in the application program. A two-step process is used to form a composite image in a screen buffer before it is copied to physical display memory.

Application buffers may be any size and are usually thought of as rectangular. Any piece of them can be mapped to any piece of the screen buffer as required. This technique permits windows for help frames, menus, and so on to be overlaid easily on to another image.

Once the screen buffer has all of its characters and attributes in the right places, the task of getting the data to the visual display is handled by **cpblk**. Because the screen buffer is copied directly to the part of display memory being viewed, the user sees the screen being updated, albeit very quickly.

#### A demonstration

Listing 2 is the C source code for a test driver program called ST (for screen test). The **#ifdefs** are provided for Computer Innovations C 2.3A,

Microsoft C 3.0, and Lattice C 3.0G. Other C compilers may require different codes to obtain the data segment register value needed for the block transfer. ST dynamically creates five screen buffers in main memory and loads them with known values. The character used for each of the screen buffers (0 to 4) is its number.

The **wait\_ch** function (listing 3) calls DOS function 8H, which returns the next available character in the keyboard buffer. The function waits for a key to be pressed if nothing is ready. If the returned value from the DOS call is a null byte, **wait\_ch** reads another, which is the value of an extended code from the keyboard. The driver program displays a help message for any key pressed except 0-4, Esc (the quit command), and Ctrl-Break (abort).

The driver program is using a trick to produce the appearance of instant screen displays. About one-tenth of a

second is required to copy a screen buffer in the application data space to the display adapter using **cpblk**. Although this is fast in comparison to other methods that also curb video interference, it is still far from instantaneous. The trick is called page flipping, a method made possible by the fact that the CGA has enough display memory to hold multiple screen pages simultaneously.

Page flipping depends on having a means of telling the display system to view one page of display memory while the application is writing to another. The ROM BIOS video interrupt has a function (5) that sets the visual page. Users should ignore the *IBM Technical Reference* statement that the function sets the active page.

Notice that the **sprintf** standard library function writes to standard error, which appears on the visual page. **Cpblk**, however, is directed to

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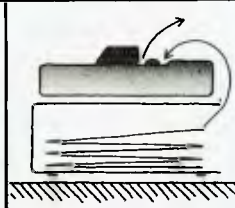
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write to the active page, which is effectively hidden from view. When the active page has been fully written, it is revealed to the user by flipping the pages. The function **swap\_pg** exchanges the values of the **Apage** and **Vpage** variables, then calls **setpage** (listing 4) to switch to the new visual page. The effect is an instant update from the user's perspective. A short delay takes place while the active page is being updated before the page swap, but the user will not be able to detect it.

The special precautions taken by **cpblk** are not needed when a monochrome adaptor and display are being used. Therefore, the driver program, **ST**, checks for mode 7 and uses a standard block-copy routine that invokes the string copy feature of the 8086/88 processor. A string copy of 4K is done very quickly.

The **getdtype** function (listing 5) used the ROM BIOS video interrupt to obtain the current video mode. If **CL\_C86** is defined in the source file or in a command-line option, the C86 **sysint** DOS interface function is used. Otherwise, the **int86** interface function, supported by both Microsoft and Lattice, obtains the needed value.

**ST** takes the easy way out of a dilemma. If a mode of 2, 3, or 7 is returned, the program runs to completion. If any other mode is returned, **ST** calls the **err\_exit** function (listing 6), which displays an

error message and returns control to DOS.

Because the Computer Innovations C86 compiler does not recognise the **void** type specifier, a **typedef** is used to alias references to **void** to type **int**. Because no return of either control or a value from an error-exit operation is expected, the conditional compilation route was chosen using a return type of **int** from the exit function.

To create the **ST** program using Microsoft C 3.0 or Lattice C 3.0, the programmer should first be sure that the files **ST.C**, **SETPAGE.C**, **GETDTYPE.C**, and **ERR\_EXIT.C** define **C\_C86** to be 0. Also, the **CPBLK.ASM** source file must be edited to uncomment the equate for the selected C compiler and comment out the other two equates.

A modest amount of automation is demonstrated here. The **MAKE** Program supplied with the Microsoft Macro Assembler was used to control the development and maintenance of the source files for the screen test program. The make-description file **ST** is used by **MAKE** to compile the C and assembly language source files for which no targets exist and for those targets that are out of date with respect to their companion source files. The version of **ST** shown in listing 7 is specifically for the Microsoft compiler and is invoked by the command **make st**. The compilation and assembly steps produce Microsoft-compatible object files. A macro assembler must be used to assemble **cpblk** because of the conditional assembly language directives within the source file. Both Lattice C and Computer Innovations C86 require that header files be included, so the files must be placed where the assembler can find them. Microsoft MASM 3.01 was used for the assembly step.

The **MAKE** file for **ST** is written for the **MAKE** Program that does not understand inference rules. Newer versions of **MAKE** (reportedly, those in MASM 4.0) do permit the use of inference rules and macros, which means the description file can be greatly simplified. Note the **/ml** and **/mx** switches in the **masm** command.

These cause the assembler to be case sensitive for internal and external names, respectively. The **/noi** in the link command instructs the linker not to ignore case. For Microsoft C these switch settings are necessary, and for Lattice C they must be deleted from the description file.

The compilers used for this article accept directives to search for header files and object libraries in specified directories. A hard disk is assumed in the presentation of the program preparation steps. The **ST** file may need editing for configurations different from those used here. The programs were developed and tested on a PC/XT, a PC/AT, and a PC6300, each with a 20M hard disk and running various color and monochrome display systems.

Compiling, assembling, and linking for Computer Innovations C compiler follows the same pattern as just described above. The programmer must be sure to edit the source files in order to set the necessary definitions and equates. Lattice C uses a start-up object file called **C.OBJ**, which must be the first file in the object list supplied to the linker. In addition, it requires a **DOS.MAC** include file that is selected for the memory model being used.

### Considerations

Because it takes a tenth of a second to copy data from a screen buffer to display memory, programs should not try to write one character at a time from the keyboard. This would result in a maximum update rate of six characters per second.

A better way to handle this situation is to use routines based on the BIOS and DOS interrupts to update the visual display page (they do so without causing interference) and use a separate routine to update the in-memory buffer so that it will reflect what is being displayed. The instant-screen routines should be saved for making large changes to the screen appearance.

---

*Augie Hansen owns Omniware, a software development and training company.*



## LISTING 1: CPBLK.ASM

```

;***** CPBLK *****
;
; Copy a screen buffer to display memory without visual "noise"
; (C) 1982,1986 Omniware
;
; Usage:
;       cpblk(src_os, src_seg, dest_os, dest_seg);
;       unsigned src_os, src_seg, dest_os, dest_seg;
;
; Notes:
; 1. Uses calling conventions Computer Innovations C86, Lattice,
;    and Microsoft C compilers selected by an equate.
; 2. Provides the copy function solely for the c/g adapter. Test
;    for the required hardware before calling this function.
; 3. The segments and offsets given in the calling program
;    determine whether this function does a screen save or a
;    screen update operation.
;*****

;-- compiler compatibility (use one of CI_C86, LATTICE, or MICROSOFT) --
;CI_C86      equ 1      ; Computer Innovations, C86 version 2.30A
;LATTICE     equ 1      ; Lattice, version 3.00G
;MICROSOFT   equ 1      ; Microsoft, version 3.00

ifdef CI_C86
    include model.h
    include prologue.h
else
    @ab equ 4      ; small model only
endif
ifdef LATTICE
    include dos.mac
endif

a1 equ @ab
a2 equ @ab+4

;----- video status information -----
VSTAT equ 3dah      ; video (CRT) status register
HRTICE equ 1         ; horizontal retrace bit mask
VRTICE equ 8         ; vertical retrace bit mask
;-- block data (these values result in 8 extra bytes being copied) --
BLKCNT equ 6         ; no. of buffer blocks to copy
WRDCNT1 equ 240       ; no. of words to copy during ver. retrace
WRDCNT2 equ 94        ; no. of words to copy during raster scan
BYTECNT equ 2 * WRDCNT2 ; no. of bytes to copy during raster scan

ifdef LATTICE
    pseg
endif

ifndef MICROSOFT
    assume cs:_TEXT
    _TEXT segment byte public 'CODE'
    public _cpblk
    _cpblk proc near
    else
        public cpblk
        cpblk proc near
    endif

;----- save registers and flags -----
    push bp
    mov bp,sp
    push di      ; di and si saved because new C compilers
    push si      ; use them for register variables
    push ds
    push es
    pushf

;----- get the source address -----
    mov si,a1(bp)
    mov bx,si
    mov cl,4      ; shift to extract segment
    shr bx,cl
    add bx,a1+2(bp) ; normalized source segment

;----- get the destination address -----
    mov di,a2(bp)
    mov dx,di

```

```

    mov cl,4      ; shift to extract segment
    shr dx,cl
    add dx,a2+2(bp) ; normalized destination segment

    mov ax,0fh
    and si,ax      ; source pointer
    and di,ax      ; destination pointer

    cld            ; set up for auto increment
    mov ds,bx      ; source segment
    mov es,dx      ; destination segment
    mov ah,BLKCNT  ; number of blocks to move

;----- COPY A BLOCK -----
;
; The buffer is copied to the display memory in blocks. Each block
; is copied in two parts. First, a chunk of words (character and
; attribute) is copied during the vertical retrace period and then
; individual words are copied during the horizontal retrace periods
; of the normal screen update period. The display is not blanked.
;-----

copy_block:
;----- copy character/attribute words during vertical retrace -----
    mov cx,WRDCNT1 ; number of words to copy
    mov dx,VSTAT   ; c/g adapter status register

wait_vert_refresh:
    in al,dx      ; read status
    test al,VRTICE ; test vertical retrace bit
    jnz wait_vert_refresh ; loop until in a refresh period

wait_vert_retrace:
    in al,dx      ; read status
    test al,VRTICE ; test vertical retrace bit
    jz wait_vert_retrace ; loop until retrace starts
    rep movsw     ; move a block of char/attr words

;----- copy single bytes during horizontal retrace periods -----
    mov cx,BYTECNT ; number of bytes to copy
    cmp cx,0       ; anything to copy?
    jz short bypass_horiz ; no -bypass horiz. period updates
    mov dx,VSTAT   ; read c/g adapter status register

wait_horiz_refresh:
    in al,dx
    test al,HRTICE ; test horizontal retrace bit
    jnz wait_horiz_refresh ; loop until not in a retrace period
    cli           ; can't tolerate an interrupt here

wait_horiz_retrace:
    in al,dx
    test al,HRTICE ; test horizontal retrace bit
    jz wait_horiz_retrace ; loop until retrace starts

    movsb         ; copy a byte
    sti           ; interrupts OK now

    loop wait_horiz_refresh

bypass_horiz:
;----- see if all rows have been copied -----
    dec ah        ; reduce the block count
    cmp ah,0      ; done?
    jnz short copy_block ; no - do it again

;----- clean up and return to caller -----
    popf          ; yes - restore flags...
    pop es        ; ...and the registers
    pop ds
    pop si
    pop di
    pop bp
    ret

ifdef MICROSOFT
    _cpblk endp
    _TEXT ends
else
    cpblk endp
endif

```

```

ifdef LATTICE
endps
endif

ifdef CI_C86
include epilogue.h
endif

end

```

## LISTING 2: ST.C

```

/*****
 * st -- screen test using cpblk function
 *
 * Author: Augie Hansen
 * Written: 09/10/84
 *
 * Copies buffer contents into the c/g adapter's display memory
 * while eliminating "snow" by writing only during retrace periods.
 * Writes to on undisplayed page (active) and then flips the active
 * and visual pages to obtain a truly instant update.
 *
 * --- Revision record ---
 * 02/12/86: Added page-flipping feature for instant screens and
 * code to determine the display system type in use.
 * 03/20/86: Revised for use with Microsoft C, Version 3.00 and
 * Lattice C, Version 3.00G
 *****/

/* set the following define to 1 for CI C86; 0 otherwise */
#define CI_C86 0

#include <stdio.h>
#include <dos.h>

#define ASCII 0x7F
#define ATTR 0x17
#define CG_SEG 0x800
#define CGA_C80 3
#define CGA_M80 2
#define MONO 7
#define MONO_SEG 0x8000
#define PAGESIZ 0x1000
#define PG0_OS 0
#define PG1_OS PG0_OS + PAGESIZ
#define ESC 27

#if CI_C86
#define MOVEIT(a, b, c, d, e) movblock(a, b, c, d, e);
typedef int void;
#else
#define MOVEIT(a, b, c, d, e) movedata(b, a, d, c, e);
#endif

int Apage, Vpage; /* active and visual display pages */

main(argc, argv)
int argc;
char *argv[];
{
    int ca; /* character/attribute pair */
    int *cap; /* char/attr pointer */
    int ch; /* user command character */
    unsigned dseg; /* destination buffer segment */
    int dtype; /* display system type */
    int os; /* page offset in bytes */
    int *sbuf[5]; /* array of screen buffer pointers */
    int sn; /* screen number */
    int special = 1; /* use special copy routine */
    unsigned src; /* source buffer */
    unsigned sseg; /* source segment */

    /* segment register values */
    #if CI_C86
    struct segregs sr;
    #else
    struct SREGS sr;
    #endif

    void err_exit(); /* error handler */
    char *malloc(); /* memory allocator */

```

```

void movedata(); /* intersegment block copy */
void segread(); /* get segment reg values */
void swap_pg(); /* swap display pages */

static char pgm[] = ( "st" ); /* program name */

/* initialize destination segment */
if ((dtype = getdtype()) == CGA_C80 || dtype == CGA_M80)
    dseg = CG_SEG;
else if (dtype == MONO) {
    dseg = MONO_SEG;
    special = 0;
} else
    err_exit(pgm, "requires 80-column text mode", 1);

/* process command line */
if (argc > 2)
    err_exit(pgm, "usage -- st (x)", 2);
else if (argc == 2)
    special = 0; /* bypass special block move */

/* get data segment value */
segread(&sr);
#if CI_C86
sseg = sr.sds;
#else
sseg = sr.ds;
#endif

/* set up "active" and "visual" display pages */
Apage = 1; /* page being written to */
Vpage = 0; /* page being viewed */

/* create the demonstration screen buffers in memory */
for (sn = 0; sn < 5; ++sn) {
    /* form the fill character/attribute pair */
    switch (sn) {
        case 0: ca = 0x1730; break; /* '0', wht on blu */
        case 1: ca = 0x0631; break; /* '1', brn on blk */
        case 2: ca = 0x0632; break; /* '2', yel on brn */
        case 3: ca = 0x2033; break; /* '3', blk on grn */
        case 4: ca = 0x4734; break; /* '4', wht on red */
    }

    /* allocate a screen buffer */
    if ((sbuf[sn] = (int *) malloc(PAGESIZ)) == (int *) NULL)
        err_exit(pgm, "out of memory", 3);

    /* fill the buffer */
    cap = sbuf[sn];
    while (cap < sbuf[sn] + (PAGESIZ >> 1))
        *cap++ = ca;
}

/* display buffers on user's command */
fprintf(stderr, "\n 0-4 for screen buffers, Esc=exit \n");
while ((ch = wait_ch()) != ESC) {
    if (ch >= '0' && ch <= '4') {
        if (dtype == MONO)
            os = 0;
        else
            os = (Apage == 0) ? PG0_OS : PG1_OS;
        src = (unsigned) sbuf[ch - 0x30];
        if (special)
            cpblk(src, sseg, os, dseg);
        else
            MOVEIT(src, sseg, os, dseg, PAGESIZ);
        if (dtype != MONO)
            swap_pg();
    } else
        fprintf(stderr, " 0-4 for screen buffers, Esc=exit \n");
}

/* restore normal visual page and return to DOS */
setpage(0);
exit(0);
} /* end main() */

/*
 * swap_pg -- exchange the global "active" and "visual" page
 * values and switch to the new visual page
 */

```



```

void swap_pg()
{
    int tmp;

    /* exchange the page values */
    tmp = Apage;
    Apage = Vpage;
    Vpage = tmp;

    /* switch to the new visual page */
    setpage(Vpage);
} /* end swap_pg() */

```

### LISTING 3: WAIT\_CH.C

```

/******
 * wait_ch -- Get next character from keybd buffer.
 *
 * If none is ready, the function waits for an input before returning
 * to the caller. If the input is non-null, it is returned as a 7-bit
 * ASCII code. If it is null, the next character is read and returned
 * as an 8-bit code with the MSB set to indicate an extended scan code.
 * Responds to Ctrl-Break input.
 *
 *****/

#include <stdio.h>

#define ASCII 0x7F
#define HIBIT 0x80
#define KEYIN_CB 8

int wait_ch()
{
    int ch;

    if ((ch = bdos(KEYIN_CB) & ASCII) == '\0')
        ch = bdos(KEYIN_CB) | HIBIT;

    return (ch);
} /* end wait_ch() */

```

### LISTING 4: SETPAGE.C

```

/*
 * setpage -- select "visual" screen page. Don't believe what you
 * read in the IBM Tech Ref -- this is definitely not the "active"
 * display page (where active and visual definitions are those used
 * in the Microsoft/IBM BASIC SCREEN statement).
 */

/* set following define to 1 for CI C86; 0 otherwise */
#define CI_C86 0

#include <dos.h>

#define VIDEO_IO 0x10
#define SET_PAGE 5

int setpage(pg)
int pg; /* visual screen page */
{
    #if CI_C86
        unsigned char vec = VIDEO_IO;
        struct regval {
            int ax, bx, cx, dx, si, di, ds, es;
        } srv, rrv;

        srv.ax = (SET_PAGE << 8) | pg;
        return (sysint(vec, &srv, &rrv));
    #else
        int intno = VIDEO_IO;
        union REGS inregs, outregs;

        inregs.h.ah = SET_PAGE;
        inregs.h.al = pg;
        return (int86(intno, &inregs, &outregs));
    #endif
} /* end setpage() */

```

### LISTING 5: GETDTYPE.C

```

/*
 * getdtype -- retrieve the screen mode value
 */
/* set following define to 1 for CI C86; 0 otherwise */
#define CI_C86 0

#include <dos.h>

#define VIDEO_IO 0x10
#define GET_STATE 15
#define LOBYTE 0xFF

int getdtype()
{
    #if CI_C86
        unsigned char vec = VIDEO_IO;
        struct regval {
            int ax, bx, cx, dx, si, di, ds, es;
        } srv, rrv;

        srv.ax = GET_STATE << 8;
        sysint(vec, &srv, &rrv);
        return (rrv.ax & LOBYTE);
    #else
        int intno = VIDEO_IO;
        union REGS inregs, outregs;

        inregs.h.ah = GET_STATE;
        int86(intno, &inregs, &outregs);
        return (outregs.h.al);
    #endif
} /* end getdtype() */

```

### LISTING 6: ERR\_EXIT.C

```

/*
 * err_exit -- issue a diagnostic message and terminate
 */

/* set following define to 1, for CI C86; 0 otherwise */
#define CI_C86 0

#include <stdio.h>

#if CI_C86
typedef int void;
#endif

void err_exit(pname, msg, level)
char *pname, *msg;
unsigned int level;
{
    fprintf(stderr, "%s: %s\n", pname, msg);
    exit(level);
} /* end err_exit() */

```

### LISTING 7: ST

```

# makefile for ScreenTest (st) program
st.obj: st.c
    msc st;

cpblk.obj: cpblk.asm
    masm cpblk /ml /mx;

err_exit.obj: err_exit.c
    msc err_exit;

getdtype.obj: getdtype.c
    msc getdtype;

setpage.obj: setpage.c
    msc setpage;

wait_ch.obj: wait_ch.c
    msc wait_ch;

st.exe: st.obj cpblk.obj err_exit.obj getdtype.obj \
    setpage.obj wait_ch.obj
    link st err_exit getdtype setpage wait_ch cpblk /noi, st,;

```

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# Color from Japan

Toshiba's new range of three-in-one printers includes its first color model, the P351C. It combines four color output without losing speed and is based on high resolution 24-pin technology. The range also includes a new economy model, P321 and the wide carriage P341E.

The P351C incorporates letter quality output at 100 cps, draft output at 288 cps and dot graphics capability with two

levels of resolution. A wide range of fonts and other language character sets are available in plug-in cartridges and on disk for downloading from a processor.

**P351C \$2495 (ex. tax).**

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*The new Toshiba P321 printer offers software selectable multiple fonts, pitches and line spacing*

## TAS becomes Australian

Fletcher DP Services, the Melbourne-based software house, has released an Australian version of the US-developed TAS business accounting software, (released in May 1985), which incorporates source code.

The package features debtor and creditor stock control plus sales and general ledger solutions. The source code lets users make specific modifications.

In tailoring TAS for Australian users, Fletcher incorpo-

ates the use of graphics in screen displays and makes screen layouts more attractive and simple to follow.

This package has been written in TAS fourth generation database language, runs on most eight and 16 bit PCs and supports many network and hardware configurations.

**TAS (Australian version) \$589**

*Fletcher DP Services,  
Suite 7,  
322 St Kilda Road,  
St Kilda VIC 3182  
(03) 537 2811*

## The stylish Freedom ONE

Freedom ONE, Liberty Electronics' stylish new ASCII terminal has been released here.

The distinctively-designed, compact, light-weight terminal has (as standard) features 132 column display capability, 44 programmable keys, a flat screen that can tilt and swivel, dual RS232C ports, double high/double wide characters, non-glare display, and split screen capability.

The unit's keyboard is detachable and its 44 function keys can double to support 88 functions.

Freedom ONE marks a further step in Liberty's push into the terminals marketplace. The US-based company started in 1982 with the Freedom 100.

**Freedom ONE \$895**

*W.J. Moncrieff Pty Ltd,  
176 Wittenoom Street,  
East Perth WA 6000  
(008) 99 9254 (toll free)*



*Liberty's ASCII terminal which combines video and power supply electronics on a single board*

## Picture your screen

The MicroColor Camera, from Dunn Instruments makes photographic slides or prints direct from most PCs and software packages. Four film formats and 18 film types are available and the camera, which features a built-in miniature CRT for previewing, comes in a high resolution version and a standard model.

An optional universal port accepts a SX-70 Module, a Polaroid Land Pack film holder (models 550 or 545), or a Kodak

Module Instant Film Pack. Switch selections on the front panel of the camera allow the user to access 18 pre-programmed film profiles, with exposure adjustment for each color.

Marketed by Techway Ltd, the standard rate camera is \$6500 and the higher rate model is \$9000.

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# It was a cold and snowy night



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## NEW PRODUCTS

### Expansion and protection

The PortaFile20, from Western Digital, is a 20M hard disk expansion system for the IBM PC XT and compatible. It features automatic head locking to ensure data protection during transportation.

Connection to the host is via the XT's built-in PC bus compatible adapter. The PC host needs no additional current capacity to drive the hard disk and its connection does not reduce the number on expansion features.

PortaFile can be daisy-chained with similar units or additional PortaFiles for storage expansion or file back ups. The unit has the Xtree file management program to assist with directory and sub-directory organisation. It allows the user to copy, delete, rename, recreate directories and execute other programs without using DOS commands.

**PortaFile 20M fixed disk kit \$3160.**

Daneva Australia,  
64-66 Bay Road,  
Sandringham VIC 3191  
(03) 598 5622  
(02) 957 2464

### Zenith aims at offices and education

The Z-148 from Zenith Data Systems, is a desktop, entry level PC built around a 16 bit 8088 microprocessor. It is available as single and dual 360K disk drive models. The PC features 128K or 256K RAM (upgradable to 640K without additional expansion cards), serial and parallel ports, detached low profile keyboards, and MS DOS 2.11 and 1.25 operating systems.

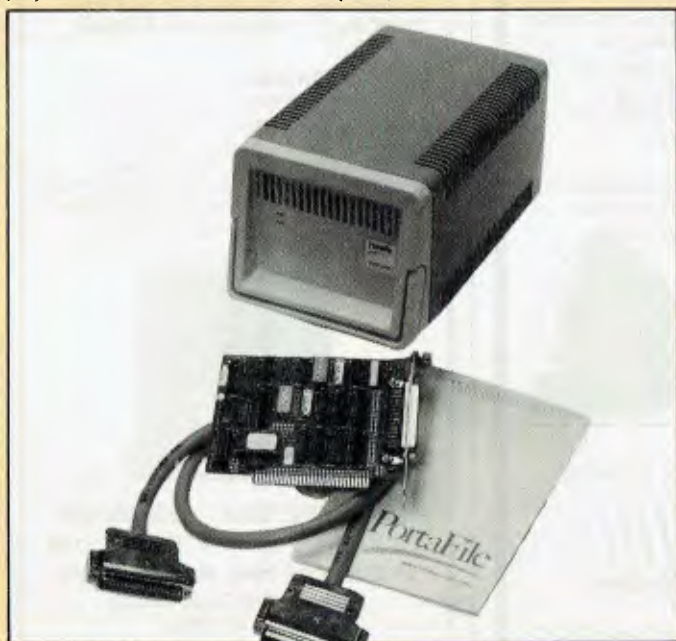
The Z-148 is aimed at the home/office market and education institutions. For fast calculations it can accommodate an 8088 maths co-processor and standard 256K chips. Open serial and parallel ports allow the user to add a printer, plotter, modem, mouse and other peripherals.

The Z-148 can function in a floppy disk environment and as an office workstation. It allows users to share information and peripherals. Its compatibility enables users to access the growing library of 16 bit software.

Anitech  
1-5 Carter St  
Lidcombe, NSW 2141  
(02) 648 1711



*The Z-148: compatibility puts it into the growing home, office and education markets and with open ports can add a printer, plotter, modem and mouse*



*The PortaFile hard disk expansion system needs no additional current*

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## NEW PRODUCTS

### Enhanced, but still friendly

Zenith Data Systems' Z-200 advanced PC is an Intel 80286 microprocessor-based system that is able to process information up to three times faster than the 8088 processor. The Z-200 combines user-friendly features with greater processing speed, upgraded memory, enlarged storage capacity, enhanced keyboard design and quiet operation.

The AT-compatible PC is aimed at the general business applications user, engineering workstations, scientific LANs, multi-tasking environments, and program development communities. It can run most PC and XT developed software programs.

The basic model has 512K RAM, six MHz clock speed, single 1.2M floppy disk drive, six AT-compatible expansion slots and Microsoft's 3.1 MS DOS operating system. RAM can be expanded to 16M in 1.5M blocks.

The more advanced fixed disk version has 512K RAM and a 20M high speed hard disk drive. The communication capabilities of this model include an RS-232C interface, Centronics-compatible parallel port and compatible video interface.

#### Z-200

*Anitech*

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*Lidcombe, NSW 2141*

*(02) 648 1711*



*The Z-200 advanced PC: more speed, memory and capacity, but still a quiet friendly system*

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Datachecker/DTS, supplier of point-of-sale terminals and associated computer equipment, has released PC-Master/521 which runs on a PC fitted with 10M of hard disk storage and can link up to 30 terminals.

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Features include a price look-up facility, the ability to access information on a variety of POS terminal activities through function keys and full reporting using a 132 column printer. Sales forecasting and statistical analysis can also be displayed.

By using standard LAN products one PC can supply information to each of the terminals in a store while others can be used for other on-site applications.

**PC-Master/521 software \$2500**  
*Datachecker/DTS,*  
*127 Alexander Street,*  
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*(02) 439 4011*

### Epson releases the FX105

The FX105, the latest model in the FX100 printer series, provides letter quality printing in a 136 column, nine pin dot matrix format and is suitable for spread-

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*Epson's latest printer, the FX105: suitable for small business applications*

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MS-DOS programmes are aimed at the IBM-PC and close compatibles. The NEC APC III will often require the software library extension card to be able to execute these programmes. Documentation is included on the disks where required — often it is very extensive. Unfortunately, we are unable to provide telephone tutorials on using the programmes.

MS-DOS disks are formatted for standard MS-DOS 2.11 360K. Testing has been carried out for CP/M disks on a Z80 Kaypro II. About 120 different formats are supported, including Kaypro, Osborne, Tandy, Microbee, Bondwell, Commodore 128, Televideo and Apple II, but not Commodore 64.

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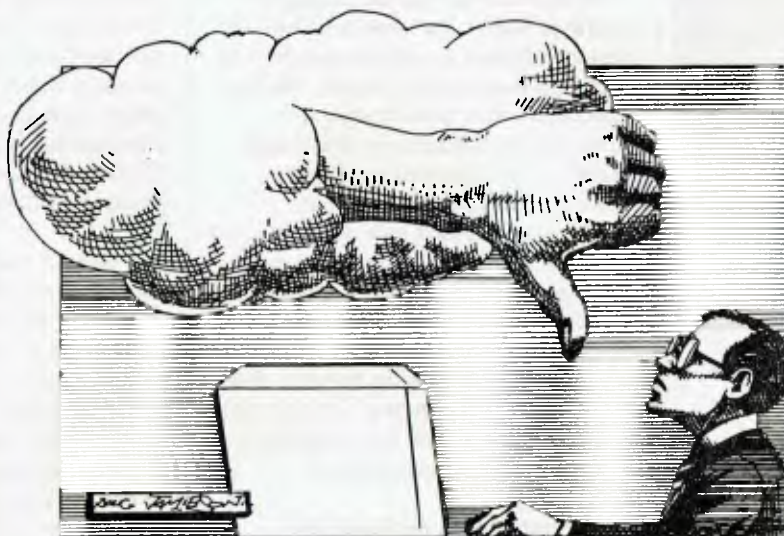
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# Integrate or separate?



Users of PCs are having integration of software thrust upon them. Software 'popularity' trends are in fact enforced by commercial realities and the propensity of software developers to tell us what we should be using.

Using a PC is, for most of us, a continuous struggle to cope with new and better ways of doing things. Software houses keep churning out new packages with more and more advanced features, and the flavor of the month is undoubtedly integration — the bundling of assorted types of applications software into a single, presumably happier, environment. But nothing in life is free, and perhaps it is time to take a deep breath and consider whether software integration is worth the price.

My own feeling is that in this case separate is often superior. Before we examine that admittedly brash statement, let us take a brief look at how we got into the present muddle.

The introduction of the PC caused a tidal wave in the otherwise placid seas of the "typical office". Without

going into detail, which has certainly been done often enough lately, we can contrast the introduction of the PC with the introduction of the motor car. The car represented a quantum leap in a known technology — transport. Horses, trains, and transport routes already existed and this pre-determined the way a car would look and what it would do. With the PC, however, it was the other way around. The machine was invented without any real idea of what it could, should or would be used for.

The early development of PC software was attended by a great deal of confusion, for both users and developers. It quickly became apparent that outside specialised applications, the big three were going to be word processing, spreadsheet analysis, and database management. Other non-specialist applications, such as communications and business graphics, while greatly in demand, owe their popularity to their effectiveness as ancillaries to the big three, which are still the bread and butter of the software industry.

If you examine how a computer works, you quickly realise that the big three have a lot more in common than is generally believed. After all, both spreadsheets and word processing applications are special cases of a database. As such they are as closely related at machine level as they are in the office environment. Each represents a way of making a computer do something that used to be done with pencil and paper so a move toward integration of the big three appears to be a natural evolutionary step. Of course integration posed a solution to the 'compatibility problem', caused by early standalone packages using their own file structures which severely limited the ability to transfer information from one application to another. At best there was a slow and complicated facility to translate files to some form of generic structure such as 'system data format' which could be re-translated into the native structure of some other packages.

So Lotus 1-2-3, the first integrated product of any significance, was



virtually pre-ordained and seemed a dream come true to a host of frustrated users.

As time went by users learned more about what was possible with a PC and became hungry for more and more advanced features which were continually coming out in standalone packages. An integrated package of the present generation contains applications which come close to the best of the standalones but they are also far more complex than their predecessors.

They require far more memory, and the commands which are specific to each application, make them difficult to learn. Looking at the top-rated standalone packages today, one can expect that in six to 12 months there will be new 'orchestrations' of integration which will match them feature for feature, but will require memory in excess of a megabyte and at least 10M of storage.

What, then, are the alternatives if you are just a simple soul like me, trying to determine which software tools are the best for the job?

From the start my approach tends to be that of the purist. When I am feeling unwell, the GP is just my first stop. If it is anything serious, I go to a specialist.

Note well that a GP is a general practitioner — not several specialists in one body. The reason for that is

obvious but it bears repeating: there is a finite limit to what one man can (or should) do. The principle applies equally to software. If a package is designed to be all things to all people, it will finish up being nothing to anyone.

My considered advice to anyone confused about the issue is to buy the best standalone package available for each application you require. Such an approach today is no longer a compromise solution, as few if any sacrifices are required and the potential advantages are great.

Think of yourself as a do-it-yourself package integrator. You have selected the best packages for each type of work, and you can use them in a 'friendly environment', (ie, you make them do what you want them to do). Now for the good news — if there still appears to be a need for integration you can buy a special-purpose package.

The integration packages are Windows, TopView, Gem, and other programs of that ilk which allow you to have more than one application 'active' at the same time and swap data among them.

But integration is itself becoming less and less necessary. Look at some of the facilities offered by the standalone packages I use on a daily basis. Word Perfect and Crosstalk, are state-of-the art packages in their fields, loaded with advanced features and Multiplan and dBase II are older but familiar friends.

A typical job might require me to assemble some statistical data, incorporate it into a report and send the report by phone line to the editor of PC Australia. The first task is to assemble the statistics. Either dBase or Multiplan can be used, depending on the complexity of the data, the repetitiveness of the task, and the requirement for ad hoc variations. Either package will produce an ASCII output file in lieu of a printed report (although in all fairness it is not as easy to do in dBase as in Multiplan).

Next, Word Perfect will directly load an ASCII file from any directory, either as a new document or

as text merged into an existing file. Whatever editing is required can be done now, using advanced features close to those of a dedicated word processing system. (I do not speak idly. My secretary uses a dedicated word processing system, and Word Perfect on the PC leaves it for dead.) If I need to, I can instantly call up Sidekick to double-check calculations or make notes of an interrupting phone conversation. When I am through editing the report, Word Perfect can directly save the completed document as an ASCII text file.

Then we load Crosstalk, which can be programmed to automatically access the modem, dial the number, submit identification to the host, and prompt me for the name of the file to be transmitted. Made a mistake? I can load the DOS command processor, do a bit of file housekeeping, call up Word Perfect or Sidekick, make a few changes to the file, and return to Crosstalk without ever really having left it.

In the course of the exercise we have used two features which allow us to say our software is integrated. We have exited an application without terminating it, performed other tasks, and then returned to the original application; and we have used the ASCII lingua franca to exchange data quickly and easily among the applications.

Now look a little more closely at the need for swapping data back and forth among applications. We have been using the big three applications in ways that blur the lines between them, but within themselves each is beginning to look more like the others. Looking first at dBase II and Multiplan (remembering that they are both fairly old as PC software goes) we find that they both contain low-level word processing facilities. Line-oriented they may be, but either of them can be used to produce a complete report containing any combination of text, data, and tables. They will even directly address the printer to set fonts, margins, page lengths, and so forth.



More modern database packages offer advanced features for text-handling and (oddly enough) can easily be made to act as a spreadsheet. Word processing packages offer advanced features for math columns, table look-up, and record-oriented merging features which in many cases obviate the need for a separate spreadsheet or database.

We have looked at some pretty compelling evidence that integrated packages are unnecessary. What is it that makes the standalone package superior?

It makes sense to have a command syntax which is closely related to the application, without the overheads of conforming to a 'generic' format. It also makes sense to maintain an ability to change application packages when something better comes along, rather than wait for a new offering whose major reason for being might be unrelated to your own requirements.

But the key issue is still specialisation itself. Here and now you have all the power of a computer at your fingertips, with thousands of man-months of programming behind your applications programs. No more waiting for an EDP bureaucracy to get around to looking at your problems, then proposing a 'fix' based on what they think you need. Buying an integrated package is akin to turning over your PC to a committee.

An audiophile would not dream of buying a three-in-one combination stereo from the best department store in the land because he knows he can build a better 'integration' of components selected on their individual merits, often at less cost. All commercial software packages work to some extent, but none of them are as good as they should be when it comes to an individual user's requirements. You know better than anyone else what your needs are, and you should preserve your independence as much as you can. ■

*Marshall Emm is the Wool Systems supervisor at Elders Pastoral in Adelaide.*

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# Helpers on command



*If you have any hints, tips or patches which you would like to pass on send them to User-to-User, C/O PC Australia GPO Box 55A Melbourne Vic, 3001. Authors of published items will receive a complimentary box of diskettes.*

For PC users with a floppy-based system, we have a suggestion to keep useful batch files and utilities on-line within a RAM-disk. This is followed by some user tips. It is good to see the response we are getting suggesting improvements and enhancements to previously published material. This information exchange and user interaction helps other users gain even more productivity, utilisation and satisfaction from their PCs.

## John's little helpers

One of the limitations of a floppy-only system is that you do not always have readily at hand all those useful little utility programs that make it so much easier to use a PC. By making good use of the DOS PATH command you can overcome some of those limitations.

First create a directory on your boot disk containing your most used utilities (I call mine HELPERS). Now add to your AUTOEXEC.BAT file code similar to the following:

```
DR C:/M=40
MD C:\HELPERS
COPY\HELPERS *.* C:\HELPERS
PATH C:\HELPERS
```

The first command creates a small RAM-disk using the public domain program DR.COM. Then we create a directory on the RAM-disk called HELPERS, copy across all the files from the HELPERS directory on the boot disk to the RAM-disk, and the final line uses the DOS command 'PATH', telling DOS where to find a program if it is not available in the current directory. Now you can execute those useful utilities no matter which drive you are logged onto, and without them having to be on that particular disk.

John Trappett  
Petrie, Qld.

*If you have the memory to spare, this tip can make life much easier. You can also use other RAM-disk utilities if you do not have access to DR.COM.*

## Wildcard helper

I am frequently frustrated by DOS commands and programs that fail to recognise wildcards. For example the command TYPE \*.DOC will produce an error. This problem can be overcome by using the batch sub-command FOR. Used in a batch file this command can be used to emulate wildcards in programs which do not internally support them.

Create a batch file named WILDCARD.BAT containing the following line:

```
FOR %%A IN (%2) DO %1 %%A
```

Now to print out all documentation files, type:

```
A>WILDCARD TYPE *.DOC
```

DOS replaces every %1 in the batch file with the first parameter after the batch filename and every %2 with the

second parameter after the batch filename. DOS now works through the list of files it can find which match with \*.DOC and creates a list of commands.

WILDCARD can be used for other functions and filenames. The syntax in each case is:

```
A>WILDCARD function filename
```

Lonnie Riley  
Brisbane, Qld.

*This is a short but powerful batch file helper that can extend command versatility. This can not only be used with the DOS TYPE command but with any command that will not recognise wildcards.*

## Format bells

This patch makes the DOS 2.10 FORMAT command beep after the prompt to enter the volume label. Happy formatting!

```
A>DEBUG FORMAT.COM<enter>
-E 118A<enter>
07<enter>
-W<enter>
-Q<enter>
```

Andrew Leigh  
Pennant Hills, NSW.

*This is a handy change to FORMAT.COM for those who multitask. Do something else while you are formatting disks, and let the beep indicate when your intervention is needed. To make it beep when the message "Format another [Y/N]" is displayed, enter the patch as:*

```
A<DEBUG FORMAT.COM<enter>
-E 0F80<enter>
59 2F 4E 20
07<enter>
-E 118A<enter>
07<enter>
-W<enter>
-Q<enter>
```



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## USER-TO-USER

### BASIC challenge

In response to the request for a method of unprotecting BASIC programs I use this method on my Challenger. First of all, load the protected program, then type NEW and press <enter>. Type PRINT CHR\$(15) and press <enter>, and a star-like figure will appear in the first column of the next line. Move the cursor up to the star, press <Ins>, type PRINT "

This text will appear in front of the star. Press <enter> once more and the program can now be listed, but the first line will be corrupted. The program will not run and cannot be edited under BASIC.

Save the programme using the ASCII save option and correct the first line using your favorite text editor.

A. B. Pilkington  
Newcastle, NSW.

*My thanks to A.B. for responding to the call. Any others will be appreciated. Refer to February and June issues for details on the IBM PC.*

### Getting more economy

Alan Luchetti's suggestion ("Economic batch files" in User-to-User June 86) is of real value on my system which has a lot of applications on hard disk, and a lot of batch files. As he notes, a large batch file can be rather slow in operation, because DOS searches first for the %0 label and then searches the whole batch file again for the ":ENDB" label.

The process can be speeded up considerably, at a small additional cost in disk space, by getting rid of the second search. Instead of using the "GOTO ENDB" statement, first create an extra batch file called ENDB.BAT containing whatever cleanup or menu routines you want at the end of each function. (I use two batch files, MENU.BAT causing the program to redisplay the menu after completing the required B.BAT function, and ENDB.BAT, containing "echo on".)

Then replace every occurrence of "GOTO ENDB" with "ENDB" (or "MENU", as the case may be), and delete the ":ENDB" routine from

B.BAT. At the end of any B.BAT routine, the process will exit through ENDB.BAT or MENU.BAT, rather than re-searching B.BAT for the ":ENDB" label. Quick, simple and tidy!

Roger Brown  
Hobart, TAS.

*This modification to Luchetti's batch file provides speed improvements without unnecessarily complicating matters. The amended batch file should look like this;*

```
ECHO OFF
CLS
REM — B.BAT, the all-in-one space-
saving batch file
IF X==X%1 ENDB
SHIFT
GOTO %0
:BAT1
(copy in BAT1.BAT here)

ENDB
:BAT2
(copy in BAT2.BAT here)

ENDB
etc
```

And the new ENDB.BAT batch file simply contains ECHO ON.

### Fast ECHO

There have been a number of letters regarding the ECHO command and getting ECHO to display a few blank lines. This is presumably to help with screen formatting while running customised batch files.

The following command will display a number of blank lines using ECHO. It cuts out having a lot of single ECHO statements in your batch file and is also very fast.

```
FOR %%E IN (1 2 3 4 5 6 7 8 9 10)
DO ECHO
```

Warren Giles

*This single command displays ten blank lines and certainly is fast! While the command is a little obscure it is effective. Add or subtract symbols from the FOR list if more or less ECHO statements are required. Also ensure that each symbol in the FOR list is separated by blanks.*





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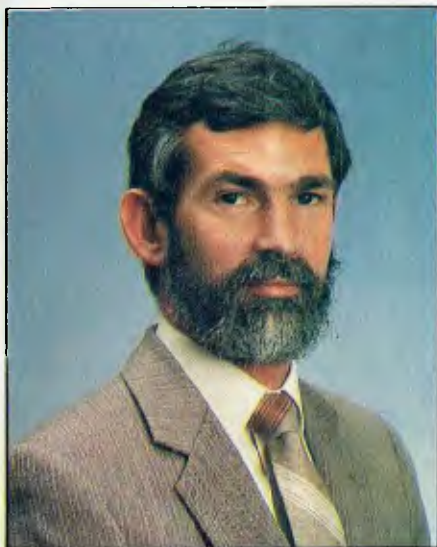
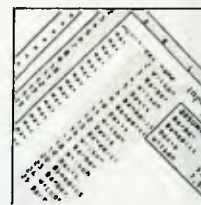
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# New way to save



If you have any hints, tips or patches which you would like to pass on send them to: Spreadsheet Clinic, PC Australia GPO Box 55A, Melbourne Vic 3001. Authors of published items will receive a complimentary box of diskettes.

I have a new approach to the problem of saving repeated calculations in different areas of the spreadsheet. It uses 1-2-3's Columnwise Recalculation mode to store results in a "stack". I can use this method to save the results of succeeding "what-if" calculations.

Figure 1 is an example of how it works. In the range B7..B17 are the results of a calculation. The calculation can be anything, but in this very simple example I have taken the variable in B5, reproduced it in B7, and increased it by 1 in each succeeding cell from B8 to B17.

Figure 1 shows the results (columns F, G, and H) of three successive iterations of this calculation, using three different variables. Obviously, the three variables were 10, 20, and 30. I can save as many different sets of results as I have "iteration" columns — in this case, six. Each time the

	A	B	C	D	E	F	G	H
1								
2		.	Zero-Flag					
3			0		I T E R A T I O N			
4		Variable						
5		30	0	0	0	1	2	3
6								
7		30	0	0	0	10	20	30
8		31	0	0	0	11	21	31
9	R	32	0	0	0	12	22	32
10	E	33	0	0	0	13	23	33
11	S	34	0	0	0	14	24	34
12	U	35	0	0	0	15	25	35
13	L	36	0	0	0	16	26	36
14	T	37	0	0	0	17	27	37
15	S	38	0	0	0	18	28	38
16		39	0	0	0	19	29	39
17		40	0	0	0	20	30	40

Figure 1: The stack in which calculation results are stored.

worksheet is recalculated, column H picks up the results from column B, and every other "iteration" column picks up the values in the column to its right.

Figure 2 shows the formulae that make the technique work. I have left out columns C, D, and E, because their formulae are identical to those in columns F and G: they point to the values in the column to the right. The @IF logical operator is nothing more than a method to set the stack values

back to zero for another round of calculations. Thus, if the zero-flag value in cell C3 (range name ZERO) is set to anything other than 0, a recalculation of the worksheet will reset all values in the iteration columns to 0.

Note that this method will work only in manual Columnwise Recalculation mode. In this mode, calculations are made one column at a time, beginning with column A and moving left to right. In the default

	A	B	F	G	H
1					
2					
3					
4		Variable			
5		10	@IF(\$ZERO,0,+G5)	@IF(\$ZERO,0,+H5)	@IF(\$ZERO,0,+H5+1)
6					
7		1*B5	@IF(\$ZERO,0,+G7)	@IF(\$ZERO,0,+H7)	@IF(\$ZERO,0,+B7)
8		+B7+1	@IF(\$ZERO,0,+G8)	@IF(\$ZERO,0,+H8)	@IF(\$ZERO,0,+B8)
9	R	+B8+1	@IF(\$ZERO,0,+G9)	@IF(\$ZERO,0,+H9)	@IF(\$ZERO,0,+B9)
10	E	+B9+1	@IF(\$ZERO,0,+G10)	@IF(\$ZERO,0,+H10)	@IF(\$ZERO,0,+B10)
11	S	+B10+1	@IF(\$ZERO,0,+G11)	@IF(\$ZERO,0,+H11)	@IF(\$ZERO,0,+B11)
12	U	+B11+1	@IF(\$ZERO,0,+G12)	@IF(\$ZERO,0,+H12)	@IF(\$ZERO,0,+B12)
13	L	+B12+1	@IF(\$ZERO,0,+G13)	@IF(\$ZERO,0,+H13)	@IF(\$ZERO,0,+B13)
14	T	+B13+1	@IF(\$ZERO,0,+G14)	@IF(\$ZERO,0,+H14)	@IF(\$ZERO,0,+B14)
15	S	+B14+1	@IF(\$ZERO,0,+G15)	@IF(\$ZERO,0,+H15)	@IF(\$ZERO,0,+B15)
16		+B15+1	@IF(\$ZERO,0,+G16)	@IF(\$ZERO,0,+H16)	@IF(\$ZERO,0,+B16)
17		+B16+1	@IF(\$ZERO,0,+G17)	@IF(\$ZERO,0,+H17)	@IF(\$ZERO,0,+B17)

DIR=A:\  
A>

Figure 2: The formulae that make the stack work

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## SPREADSHEET CLINIC

recalc mode (Natural), all the values in the iteration columns would immediately take on the values in column H.

At home I use the stack technique to store the results, for the next 30 years, of different possible refinancings of my home mortgage. At work I use it for storing the results of amino acid composition data from different proteins.

Raymond C. Duhamel

*This is a very nice trick and well worth setting up just to see it operate. The columns march magically backwards across the spreadsheet with each recalculation. It is one of the few examples where "Natural" recalculation is inappropriate as "Columnwise" recalculation is required to force 1-2-3 (or Symphony) to perform the operations in the right order.*

### Getting rid of ranges

When I build a spreadsheet with Release 2 of 1-2-3, I define a lot of range names. As I go along, I sometimes find I have defined ranges I no longer need. The macro shown in figure 3 displays all the defined ranges in the worksheet and lets me delete any or all of them.

To use it, put the cursor in any part of the spreadsheet where there is room to build a range name table and hit Alt-B. Move the cursor to a

range name you no longer need and hit Enter. The macro will let you go on deleting ranges until you hit Enter with the cursor on a blank cell. Thus, when you get to the last name to delete, just hit Enter twice to end the macro.

Mark Tharp

*Getting rid of a lot of range names without taking them all was a pain. (/ Range Name Reset is a drastic alternative). Now it is fairly simple, thanks to Mark.*

\B	NAME~{right} ADDRESS~{left}{down} /rnt~ {?}	Make column headings. Make range name table. Wait for input.
LOOP	{if @cellpointer("type")="b"}{quit} Quit if empty. /c~BLANK~ /rnd	Copy range name to BLANK. Begin deletion. Left blank for range name. Complete deletion. Erase table entry. Go back to LOOP.
BLANK	~ /re{right}~ {branch LOOP}	

Figure 3: A macro that builds a table of range names and deletes those you indicate

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# Bit rotation speeds

Michael Abrash describes two 8088 assembler routines to rotate registers.

**S**pecifications for the 8088 state that the assembly language instruction ROL AX,1 (which rotates the AX register left one bit) executes in two cycles, while the instruction ROL AX,CL (which rotates AX left the number of bits specified in the CL register) requires four advance cycles to load CL, as well as the number of cycles determined by  $CL*4+8$ , to execute. Thus, rotation using the first method seems more than twice as fast as the second.

Surprisingly, when programming for the PC, this is not the case. Table 1 shows the execution times for the code in figure 1 when performing rotations of from nought to 16 bits first with ROL AX,1 then with ROL AX,CL. The results indicate that for rotations of five to 16 bits, the method involving CL is faster. Only for rotations of fewer than four bits should ROL AX,1 be used. This is because, with the 8088, the fetch of the next instruction is not built into the instruction execution operation. Instead, a bus interface unit (BIU) reads instruction bytes into a four-byte prefetch queue. The BIU operates while the execution unit (EU) is carrying out the current instruction, using free memory in the prefetch queue as available. Instruction timing specifications are for the EU and assume that the instruction byte already has been fetched by the BIU.

Four clock cycles are required to read a byte from the PC's memory. With most instructions (especially those that access memory, because several cycles are required to calculate memory addresses), this works well and allows the

BIU the memory access time it needs to keep up with the EU. The 8088, however, features instructions that operate only on the high-speed internal registers, which causes these instructions to execute extremely fast — faster than the BIU can fetch instruction bytes. ROL falls into this category of instructions.

ROL AX,1 executes in two cycles, but it requires four cycles to fetch the next instruction byte from memory. If the next instruction is another ROL AX,1 as in a multibit rotate, the instruction is two bytes long, and eight memory cycles are needed to fetch the next ROL. Thus, multibit rotates require eight cycles, not two, to rotate by one, because the EU must wait for the BIU to fetch the next instruction. ROL AX,CL, however, does require only the specified four cycles because once the instruction is fetched, it is executed repeatedly until the rotation is complete. Moreover, because memory is free during the execution of ROL AX,CL, the next four instruction bytes can be prefetched, then executed as soon as the rotation is complete. Thus, rotation by CL is preferable.

The method used to fetch instructions also can prove a bottleneck with other examples involving register-only operands. Any instruction that takes fewer than four cycles per instruction byte to execute depletes the prefetch queue. ■

*Michael Abrash is a senior software engineer for Tseng Laboratories.*

**TABLE 1: Rotation Benchmarks**

NUMBER OF ROTATIONS (N)	ROTATED BY CL COUNT=N	ROTATED N TIMES BY 1
0	165	97
1	173	129
2	193	165
3	217	192
4	231	231
5	247	270
6	265	289
7	289	337
8	289	371
9	309	404
10	324	433
11	347	474
12	361	505
13	372	541
14	385	577
15	408	609
16	423	645

**FIGURE 1: Benchmark Code**

```

SUB    CX,CX
MOV    DX,CX
MOV    AH,1
INT     1AH      ; set clock to 0
MOV    BX,10H   ; repeat rotate 10h*10000h
LP1:
    SUB    DX,DX
LP2:
    ; insert either rotate by cl or
    ; equivalent # of rotate by 1's
    ;***** EITHER *****
    MOV    CL,2   ; change cl for desired
    ROL    AX,CL  ; # OF ROTATES
    ;***** OR *****
    ROL    AX,1   ; insert desired # of
    ROL    AX,1   ; rotates by 1
    ;**** BUT NOT BOTH ****
    DEC    DX
    JNZ    LP2
    DEC    BX
    JNZ    LP1
    SUB    AH,AH
    INT     1AH   ; get clock ticks in CX:DX

```



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# Model memoranda

**L**ogging onto BBSs in different states shows regional differences are not dead. This is particularly noticeable in Canberra on the PC-Exchange Group IBBS. Most of the users are apparently public servants and it shows. The messages are reserved, the very model of a public service memorandum. None of the wit and intellectualism of Melbourne or the free-wheeling openness of Sydney. No government secrets or leaks in sight but a restrained interchange quietly purring along.

If you want to buy a house in Giralang with a Kent fireplace for \$86,000 then the PC Exchange Group IBBS is the place to look. Other messages cover a range of computer interests including DosEdit, DOS calls from within interrupt routines, Open Access, C language and Turbo Pascal, Vtex2 for Viatel, through to BIOS keyboard vectors and more. The "Most prolific message writer" award has to go to one, Karl Auer.

BBS sysop Phil Harding is a presentation co-ordinator with Channel 7 Canberra, working around the clock shift work. He has been with the station for 15 years. When he set up PC-Exchange Group IBBS on February 8, 1985 he chose the name because he wanted to promote the exchange of ideas via software.

"I set it up because there was no BBS in operation in Canberra but there were a lot of keen computer users," he says.

About 10 users log on each day for an average of 90 minutes a call. There are 60 registered users and over 150 casual users; only two per cent are women. Most people who call the board from the Australian Capital Territory are public servants.

Harding estimates the capital cost of setting up his BBS at \$10,000. "Where a BBS is run on an extremely low budget it is extremely hard to keep up the continuity of service. That's why I have chosen to duplicate

as much equipment as possible," he says.

The PC-Exchange hardware is two separate units, an IBM PC and an unbranded clone, with 640K of RAM in both machines, STB multifunction card and a generic multifunction card, STB graphics card, two serial ports, one parallel port, one games port and generic card, one serial port on board with an RS-232 card for serial port two and one parallel port and one games port.

There are two Control Data drives and two Teac drives, one Qubie 20M hard disk drive, Amust DP80 and Olivetti Praxis daisy wheel printer, NEC colour and Commodore amber monitor and a Sendata 300/1200 full duplex auto-answer and Sendata 300 auto-answer UDM 1200 modem.

"I think that over the next two years, as modems become cheaper — especially the high speed 1200 and 2400 baud types — they will give people outside the metropolitan areas access to a range of information on their computers at a viable cost. This will move information around Australia quicker," says Harding.

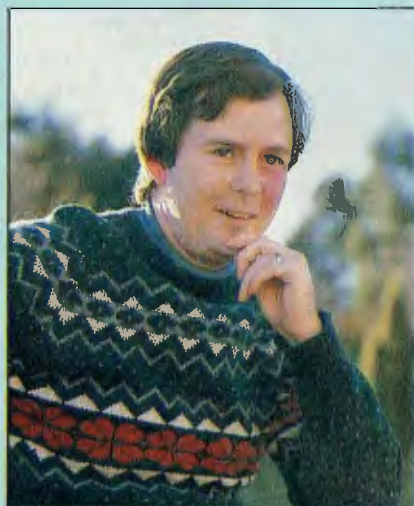
"The whole point of my BBS is to create a group that meets through the board and not in a club room. This is good for people who live out of town and find it hard to get to meetings."

Harding believes some modem companies confuse their customers into thinking that modems designed for use with the Viatel service are 1200 baud full duplex modems. He thinks that as more buyers realise the difference there will be a lot of unhappy customers.

Although he admits spending between 120 and 150 hours over recent months creating new modules Harding has not lost his sense of humour.

Asked what he does for relaxation he answers, "Change a screaming baby's nappy or turn the compact disc player onto full volume." ■

## PC Exchange Group IBBS



**Sysop:** Phil Harding.

**Phone:** (062) 58-1406

**Hours of operation:** 24

**Baud rates:** 300, 1200 full duplex.

**Parameters:** 8 Data bits, 1 Stop bit, No parity.

**Access:** Open system, visitors permitted 25 minutes daily.

**Registration:** Full membership costs \$15 annually. Cheques payable to PC-Exchange User Group, P.O. Box 35, Charnwood, ACT 2615.

**Password:** Mailed to each registered user.

**Time Limit:** Registered users have 120 minutes daily.

**Files for downloading:** Over 520, 98 per cent for IBM PC and compatibles. Many of the ARC files contain 30 to 40 utilities or games. Most of the classics and offbeat items like Movies.Arc, a movies database. Files are listed in four volumes, general, library & archive, magazine and CP/M. A downloadable manual for the BBS, called XFER.Hlp is available.





# Bulletin board

## PC User Groups

● **MELB-PC**  
Contact: Lloyd Borrett (03) 529 2333  
Time: 6.00pm first Wednesday  
Venue: Clunies Ross House  
191 Royal Parade  
Melbourne

● **Sydney PC User Group**  
Contact: Catherine Rosenbrauer  
(02) 29 7033  
Time: 5.45pm third Monday  
Venue: Ezzo Auditorium  
35 Clarence Street  
Sydney

● **Perth PC Micro Users Group**  
Contact: Peter Goodwin (09) 274 5911  
Time: 5.30pm first Tuesday  
Venue: Royal Kings Park Tennis Club  
Kings Park Road, West Perth

● **Adelaide PC Users Group**  
Contact: John Roberts (08) 212 5020  
Time: 7.45pm second Thursday  
Venue: 195 Gilles Street

● **PC Users Group Inc. (ACT)**  
Contact: Chess Krawczyk  
(062) 80 5954  
Time: 8.00pm final Monday  
Venue: Coombes Lecture Theatre  
Australian National University

● **Brisbane 16-Bit Users Group (BRISBUG)**  
Contact: Roy Willie (07) 393 3388  
Time: 2.00pm third Sunday  
Venue: Toowong State High School  
Bywong Street, Toowong

The New England PC User Group is being formed in Armidale at the University of New England. Contact Brian Hardaker, (067) 73 2195.



## BBS Directory

**Victoria**  
PC Connection IBBS (03) 528 3750  
HiSoft IBBS (03) 799 2001  
The National (03) 819 5582  
Down Under (03) 429 5819  
**New South Wales**  
PC Exchange (062) 58 1406  
PC User Group 300 Baud (02) 238 9034  
1200 Baud (02) 221 5520  
Micro Design Lab (02) 663 0150  
Sydney Public Access (02) 808 3536  
Prophet RBBS (02) 628 7030  
Dick Smith IBBS (02) 887 2276  
Tandy BBS (02) 625 8071  
**South Australia**  
Adelaide User Group (08) 271 2043  
**Queensland**  
Competron (07) 52 9498  
**Western Australia**  
Perth PC Users BBS (09) 227 9229

## APPLICATIONS USER

## SOFTWARE GROUPS

**Multiplan Users Group**  
Address: PO Box 95, Forestville, NSW 2087.  
Contact: Richard Womack (02) 997 1554.  
Meetings: 6.15 pm 2nd Wednesday,  
City Personal Computing, 55 York St, Sydney.

**dBase Users Group** (includes Framework SIG)  
Address: ACS, 72 Pitt St, Sydney 2000  
Contact: Catherine Rosenbrauer (02) 74 1961  
Meetings: 6.30pm 3rd Tuesday, ACS, 1st Floor,  
72 Pitt St, Sydney

**Spellblinder User Group**  
Contact: Kathie Hanson  
Meetings: 6.00 pm fourth Monday, Room 9,  
Trades Hall, Cnr Dixon and Goulburn Sts,  
Haymarket, NSW 2000.



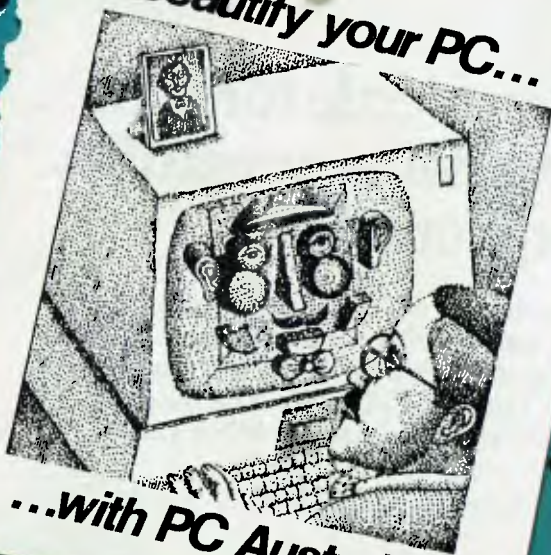
### NOTICE

If you have any further  
PC community information  
for this bulletin, contact  
Ian Robinson (03) 602-4122 or  
Margaret MacGraw (02) 325-6617

### **SPECIAL INTEREST GROUPS**

The PC User Group in Sydney has spawned a  
number of special interest groups (SIGs) which meet  
at varying times throughout the month.  
**ComSIG** — 5.45pm second Monday, ACS, 1st Floor,  
72 Pitt St. Contact Geoff May (02) 699 3518.  
**BusinessSIG** — 5.45pm fourth Tuesday, Peat  
Marwick, 31st Floor Australia Square, Pitt St.  
**CHUSIG** (Challenger PCs) — 5.45pm 2nd Tuesday,  
4th Floor, 80 Arthur St, North Sydney. Contact  
Geoff Townes.

### **Beautify your PC...**



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*The interactive guide to IBM PCs and compatibles*

## **Turbo Pascal User Groups**

### **Victoria**

Address: PO Box 81  
East Caulfield Vic. 3145  
Contact: Ron Savage (03) 651 1414  
Meetings: 7.00pm 3rd Monday St Mark's,  
cnr Canterbury Rd/Burke Rd,  
Camberwell

### **Western Australia**

Address: 2/294 Rokeby Road,  
Subiaco WA 6008  
Contact: Frank Reynolds (09) 382 2692  
Meetings: 7.30pm 2nd Tuesday  
University of Western Australia Room G3  
Electrical Engineering Building

## **Lotus User Groups**

### **Melbourne**

Contact: Robert Taylor (03) 267 4800  
Time: 5.30pm first Tuesday  
Venue: Light Car Club, 46 Queens Rd

### **Sydney**

Contact: Ron Pollak (02) 290 3655  
Time: 5.45pm first Thursday  
Venue: National Bank, 12th Floor,  
255 George St

### **Perth**

Contact: Peter Foreman (09) 322 5589  
Time: 5.30pm second Wednesday  
Venue: KMC Hungerford, 9th Floor,  
190 St George's Tce

### **Adelaide**

Contact: Paul Wragg (08) 223 5711  
Time: 7.30pm first Tuesday  
Venue: 164 Fulerton Rd, Dulwich 5065

### **Brisbane**

Contact: Bill Savage (07) 221 2144  
Time: 5.30pm first Tuesday  
Venue: MLC Centre, 28th Floor,  
230 George St

### **Newcastle**

Contact: Louis Lee (049) 26 8692  
Time: 5.35pm first Thursday  
Venue: Newcastle Gas Company, 623 Hunter St



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# The show goes on

**A**lmost immediately after completing my review of the Elders Farmlink private videotex system in last month's issue I went north to the Videotex '86 exhibition, only to find that from now on the service is to be referred to as Elderlink. Oh well — you win some, you lose some.

So, I hear you ask, how was the show? Of course, one of the hottest items on display was the July issue of PC Australia, featuring PC videotex software and yours truly, but there were other things of note as well.

For example, Syme Information Technology had a very interesting PC expansion card on display, which allowed PCs to control videodisc players. Videodiscs look like 12-inch versions of audio compact disks of CD-ROMs, but have a greater storage capacity.

The MIC-2000 controller card allows video images and PC-generated screens to be combined into a single picture on PAL or NTSC monitors. The system also provides for real-time editing of the video, audio and computer signals. This "soft-editing" procedure allows the programmer to fade in and out of video, graphics and sound, together or independently, over long or short periods. This not only saves editing time, but saves on videodisc "real estate" (the amount of data space available).

Syme Information Technology has taken this process one step further with Vidlink — a direct linkage between videodisc and videotex, based on the MIC-2000 hardware. Vidlink allows one or more videodisc players to be controlled from a central videotex database.

The potential applications for Vidlink are amazing. Price lists can be continually updated on-line, while a full-color sound and video clip of each product can be sourced from a local videodisc player — it would be

like reading a glossy brochure where the prices keep changing competitively in front of your eyes.

Applications exist for Vidlink where there is a need to combine full video or still images with information that must be updated rapidly, such as real estate guides, in travel agencies, point-of-sale units and exhibitions. Perhaps the best part of it all is that the Vidlink system has been pioneered in Australia (or to be more precise, Melbourne — long time capital of the PC universe).

Another innovation on display at Videotex '86 was neatly hidden away in a corner of the massive Viatel stand. This was ViaTalk — a variant of Viatel employing the latest text-to-speech conversion technology that allowed Viatel frames to be sent by a standard telephone receiver.

The beauty of ViaTalk is that you no longer need to access the system through a PC or terminal; just call in on any phone. Obviously, color and graphics no longer have any meaning with this particular application, and alphabetical input will not be possible, but there is still a great deal of potential. Travelling salespeople could dial up the appropriate inventory page to check on remaining stocks before closing a sale, then phone through the details later to get the stock levels adjusted.

And just imagine the new world this will open up for blind people or those visually impaired. A 12-key touch phone is required, so that the "\*" and "#" buttons can be used. This type of phone has been standard issue from Telecom for some time. One thing is certain — we are all likely to hear a lot more about ViaTalk as time goes by.

The Viatel stand also featured another development on the Prestel standard. This time it was Photo Videotex, previously described in the Videotex page (PC Australia, February 1986). Photo Videotex is

an extension of Prestel designed by the people who originally created Prestel itself, namely British Telecom. This technology is based on high-resolution images of 270 by 240 pixels (with a palette of two million possible colors) embedded in Prestel-like frames, which undergo data compression to take up 64K of memory each. The big hitch with Photo Videotex is — you guessed it — the agonising amount of time it takes for a full image to be transmitted. Obviously, this technology is just waiting for faster data transmission rates.

Another launch at Videotex '86 was none other than the PC Australia videotex bulletin board — good old page \*60063#. Although PC Australia readers have known about this system for months, it was unleashed upon the general public on the final day of Videotex '86. As you may have guessed the number of accesses skyrocketed, as a hungry PC information-starved public leapt into our unique facility. Since that time, the PC Australia bulletin board news headlines have been featured on page \*1# of Viatel many times.

There were plenty of other exciting things on display at Videotex '86 and, to be quite honest, I am still in the process of unpacking and analysing the contents of my bulging showbag. On top of all that, Videotex '86 was followed less than one week later by Ausgraph '86 — the annual computer graphics show (see the news pages in this issue).

so I have two showbags to delve through. I always tend to browse through each page of most of the brochures before I throw them out after these events, which tends to slow down proceedings dreadfully. Anyway, hopefully by next month I will have sorted everything out and will be back here to inform, entertain and amaze you once again with news from the world of PC videotex ■



# THE PRINT

## No Need for Plugging or Unplugging Computers or Printers

Sick of changing printer connections at the back of your PCs? Or waiting while your printer grinds through a document? You need a Print Manager.

### **A Print Manager saves a huge amount of time:**

**1. No more plugging or unplugging printers.** The Print Manager connects the right computer to the right printer. Up to 4 computers to 2 printers, *automatically*.

**2. No more waiting.** The Print Manager accepts data from your computer at 4 pages per second, quickly freeing it up for the next task.

**3. Use your Laser Printer more productively.** While laser printers are very fast, there is still the need to plug and un-plug, which is where the Print Manager saves the day. The Print Manager does all the connecting (up to 4 workstations). Then its 256KB buffer allows operators to *queue* jobs as they finish them, greatly boosting productivity.

There is a **Print Manager to suit your requirements**. Print Managers are available in most serial and parallel configurations, allowing almost any 4 computers to share 2 printers.

**And we don't charge a fortune for cables either!** When you need high quality IBM PC cables, call us for the lowest prices in town. At LOGO, those "expensive" \$60+ printer cables (serial and parallel) only cost a **tiny \$19.95**.

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# MANAGER



# Send in slimapop

Once in a while you hear about a program that sounds corny or mickey mouse or user group city. You do not take it seriously. That was my initial take when I first heard about a software product called *Namer*. But once I used the thing, my mind changed — fast. I was **astonished** by its capabilities and I can understand why many advertising agencies (including J. Walter Thompson) have been playing with it. It generates product names, slogans, kids' names, and other great names!

What it does best is come up with **weird product names** or intriguing company names or names for evil **science fiction characters**.

You select from a connotation menu. You can connote hi-tech, low-tech, old-fashioned, spiritual, stuff like

that. You pick a couple of connotations to get your names. Its database of plain words, prefixes, suffixes, and Latin roots is tremendous. The program creates a new word from pieces.

When I used it to create a high-tech name combined with devious connotations, I got product and company names like NoneStar, Neuroclud, Clamotech, Plegicene, Dynalust, Compulep, Polemaquant, and Photigon. **There were hundreds more!** "Yes, the new Venomaprobe from Toxidyne Corp. is *the* answer to the population explosion. A new Plegicene era will be upon us."

Combining high-tech with spiritual attributes, I got names like Hydrichron, Xenosoft, Octamind, AsteraCalc, and Alphangel. These all

sounded like **cheap pulp science fiction names**. "The Alphangels attacked us from the planet Hydrichron, Captain! What are we going to do? Dare we launch the Octamind?"

Other combinations of this and that produced Flickadot, Easibound, Wellipun, Joycross, Slimapop (yum!), **Blastoglow**, and Cretobene. You can make up your own jokes for these names. **Dynamite software!** While *Namer* is not cheap at \$US235, it is a must for the creative types out there. The company offers a two-week money-back guarantee. *Namer* is available from Salinon (which must have used its own product and then selected the wrong option to get that name) Corporation, 7430 Grenville Ave, Dallas, TX 75231. ■

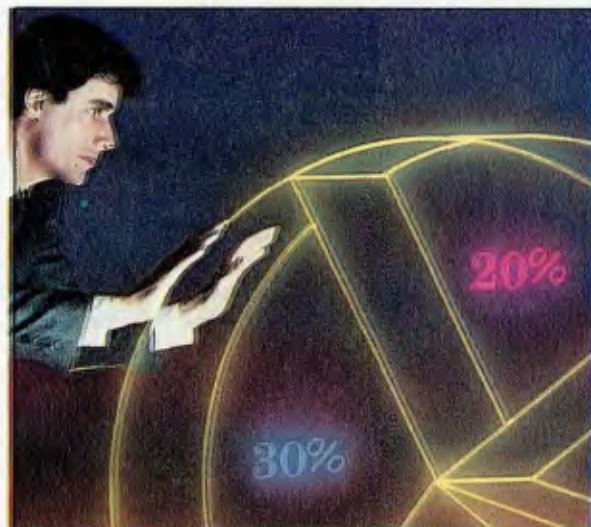


## Coming up

September promises to be a hot month for PC users with the APCON 86 convention in Sydney.

In PC Australia, artificial intelligence — a subject many readers have expressed interest in — will be featured as, keeping in line with our 'close to the customer' policy, senior writer **Les Stein** bravely embarks upon a review of Guru — a monster expert system package from the developers of Knowledgeman.

Other features will cover the EGA display adaptor and its clones, and a hands-on article describes how to view four-dimensional objects on your two-dimensional screen! With comments from **Ian Robinson**, **Vi Adelle**, **Les Stein**, **John Dvorak** and the rest of the team, you cannot afford to miss the next issue of PC Australia.



# Arrogance blues



I had just finished demonstrating some new software at a user group meeting when I noticed several people huddled around my PC. I heard "oohs" and "aahs" and then someone saying "so this is what it looks like!" Not wanting to disturb some unnatural act, I tiptoed over to have a peek and, observing nothing baneful, I inquired as to the cause of their surprise. Here was a group of seasoned PC users who had never seen a REAL IBM PC.

How encouraging that clones have been embraced by the proletariat. I would love to see IBM get its come-uppance and have to scrounge like the rest for a bigger share of the market. I am sick of IBM and their arrogant tactics, which make us all sniff around like dogs for the next bone.

I have become militantly anti-IBM since the IBM PC was first introduced in 1981, to an extent that surprises even myself, as I used to be a bright-eyed IBM admirer when I was a lad. I even wrote a school essay on Thomas J. Watson Sr, the founder of IBM. I found myself worried in 1968 that Control Data was interfering with the prosperity of the Western world when it filed its anti-trust suit against IBM.

I am not one who believes that

IBM has become an exploitative multinational criminal. The company is known to be hard-nosed but operates on acceptable business practices. It often contributes more to charity than any other US corporation and is extremely generous to its employees in all countries where it has operations.

It is not just that IBM is extraordinarily arrogant. The computer industry breeds obnoxious overnight miracles who become cocks on a dunghill for a short period. I have learned to live with instant arrogance in this quick buck, fly-by-night market and if I wanted to meet gentle souls with humility and kindness I am clearly in the wrong place. IBM has a right to arrogance as the grand old man who holds the golden sceptre. They itch, we all scratch. I accept this.

What makes me spit is that IBM is so boring. The IBM PC has stood lifeless for five years, limping behind available technology. Companies such as Compaq have proven to us that IBM has porridge in its veins. IBM never made substantive improvements on the PC, the PCjr was a step backwards, the lid was kept for too long on the clock speed of the AT, and then out dribbles a laptop with withered display technology.

If the ability and technology are in place to give us more, why does IBM give us less? Why do we have to walk when the technology would let us run?

If I have to stay chained to the monster, at least hereafter I will buy a clone that does the same for less. Granted, there are nightmare Taiwanese copies that are useless hunks of tin designed to give you megabytes of misery. But the better ones such as the Tandy models, the new Computerland machines and the inexpensive Multitechs are as solid as Don Chipp's chin. Only some outdated fear of the bogey man keeps corporations tied into boxes with

IBM on the front. I would easily prefer a 286 Compaq to an AT. For a portable, the new Zenith model or the powerful Toshiba far outshine the PC Convertible.

Is IBM worried about this? The US PC Week magazine reports that IBM executives are meeting late into the night trying to draft strategies to crush clone-makers. In the past few months, IBM has announced dozens of new products at an unusual rate. There have been network enhancements, improvements to its Assistant Series and a new version of Displaywrite. IBM recently pressed 13 Taiwanese clone companies to sign 'cease and desist' agreements. It does look to me as though they are concerned. These are not the signs of a company puffed up with overconfidence.

IBM created the standard, but an independent PC standard unrelated to IBM now belongs to us all. Software and hardware manufacturers no longer need to be worried about every IBM twitch. Consumers can think in terms of that independent PC standard and manufacturers can plan with some security.

But what if IBM really does leave us holding the bag and moves to a new standard? Another PC Week editorial concluded that "We think the independent PC standard has taken hold so strongly that, even if IBM decides to shift strategy in the months ahead, it couldn't leave the standard behind. Any proprietary IBM system, we believe, would have to remain compatible with the standard or risk open revolt in the marketplace."

We have extracted the royal jelly from IBM. The monolith has used its awesome power to legitimise the personal computer. IBM started the corporate PC ball rolling and keeps it moving. In the meantime, it has set up certain 'a priori' conditions which are the basis for exciting invention. But the computer meek have inherited the earth. ■



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Monographics Card.....	\$350
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Comcolor.....	\$340
Piggy Plus.....	\$280
Serial Plus.....	\$65
Floppy disk Tandon (Full).....	\$250
(Half).....	\$235
PCox Standard (IRMA compatible).....	\$1299
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— 20Mb internal.....	\$1095
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80287.....	\$450
8087-2.....	\$450
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Kaga III color.....	\$770
Kaga Vision IV.....	\$1065
Quibic color.....	\$695
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Epson FX 105.....	\$299



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#### Microsoft Flight Simulator<sup>™</sup>

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